

Region 2000 Regional Commission

Multi-Jurisdictional Hazard Mitigation Plan



June 2006

Participating Jurisdictions:

Altavista, Town of
Amherst County
Amherst, Town of
Appomattox County
Appomattox, Town of
Bedford County
Bedford City
Brookneal, Town of
Campbell County
Lynchburg City
Pamplin City, Town of

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Executive Summary

The vision for the Virginia's Region 2000 Partnership Local Government Council's Hazard Mitigation Plan is to lessen the impacts from natural and manmade hazards, prepare the region to respond to future events, and encourage regional collaboration by pursuing funding and promoting mitigation actions focusing on structural projects, education, information and data development, and policy and planning.

The Region 2000 Multi-Jurisdiction Hazard Mitigation Plan was developed in 2004 and 2005 to satisfy local planning requirements of the Federal Emergency Management Agency (FEMA) Disaster Mitigation Act of 2000 (DMA2K). The DMA2K legislation (Public Law 106-390) brought increased emphasis on pre-disaster planning and funding to reinforce the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, DMA2K established a pre-disaster hazard mitigation program and new requirements for the national Hazard Mitigation Grant Program (HMGP). States and local governments are now required to adopt FEMA-approved hazard mitigation plans in order to qualify for pre and post disaster federal hazard mitigation funding, such as HMGP.

For Region 2000, HMGP planning funding from Hurricane Isabel provided funds to develop a multi-jurisdictional hazard mitigation plan for the participating communities of Amherst County (including Town of Amherst), Appomattox County (including the Towns of Appomattox and Pamplin City), Bedford City, Bedford County, Campbell County (including Towns of Altavista and Brookneal), and Lynchburg City. The Region 2000 Multi-Jurisdiction Hazard Mitigation Plan followed the FEMA guidelines and publications with separate sections devoted to the following:

- I. EXECUTIVE SUMMARY
- II. INTRODUCTION
- III. COMMUNITY PROFILE
- IV. PLANNING PROCESS
- V. HAZARD IDENTIFICATION AND RISK ASSESSMENT (HIRA)
- VI. MITIGATION
- VII. IMPLEMENTATION AND PLAN MAINTENANCE
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Sections I through III provide background information on the mitigation plan and communities in Region 2000 Regional Commission. Section IV on the planning process highlights how Region 2000 contracted with the Virginia Tech Center for Geospatial Information Technology (CGIT) and the various meetings that were held through the plan development and adoption process. Section V gives a detailed account of the various hazards (primarily natural) that impact Region 2000. The table below summarizes the severity of these hazards by listing priority rank (developed by the regional steering committee) and the impact of the hazard (location in Region 2000 with highest vulnerability and overall \$ loss when estimated).

Hazard Identification and Risk Assessment Results		
Hazard Type	Rank	High Vulnerability Areas and \$ Loss
Winter Storms (Ice/Snow)	High	Snow: Western Bedford and Amherst Counties; Ice: Region wide
Flood (Hurricane)	High	Bedford County (Smith Mountain Lake), Lynchburg (James River), Town of Altavista (flood and stormwater drainage); <i>Total Annualized Regional Loss: \$2,194,531</i>
Drought	High	Area served by wells only region wide, especially Bedford and Campbell Counties
Wind (Hurricane/Tornado)	Medium	Hurricane Wind: Densely populated areas of Bedford and Lynchburg Cities and Lynchburg suburbs in Bedford and Campbell Counties; <i>Total Annualized Regional Loss: \$1,421,500</i> Tornado: US 460 Corridor in Bedford County, Bedford City, and Campbell County
Wildfire	Medium	Heavily forested areas in southern Amherst County, northern Campbell County, western Bedford County, and pockets throughout Appomattox County
Landslide and Land Subsidence	Low	Steep slope road cuts region wide, slightly higher vulnerability in Campbell and Appomattox Counties
Terrorism	Low	Specific locations throughout region as denoted by local emergency operations plans
Earthquake	None	Relatively low vulnerability region wide

Section VI presents the different mitigations actions developed by each community to address these hazards. As listed in the Plan's vision, the actions focused on structural projects, education, information and data development, and policy and planning. Communities also developed regional and jurisdictional actions, which bridged action categories and involved inter-community coordination. The table below summarizes the mitigation actions for the Region:

Mitigation Action Summary		
Mitigation Action Type	Highest Ranked Action(s)	Comments
Education and Outreach	1. Weather Related Hazards Education	Almost all communities included a weather related hazards education action, with 6 communities also having a specific drought education action.
	2. Drought Mitigation Education	
Information and Data	1. Floodplain Map Updates	Most communities included a mitigation action



Mitigation Action Summary		
Mitigation Action Type	Highest Ranked Action(s)	Comments
Development		concerning the need for new information to aid efforts to update floodplain maps for the region.
Policy and Planning	1. Integrating Human Caused Hazards into EOPs	Almost all communities included the mitigation action of integrating human caused hazards into community emergency operations plans (EOPs).
Structural Mitigation	1. Maintaining Critical Facilities during Power Disruptions 2. Monitoring and Maintain areas near Right of Ways 3. Evaluate and establish adequate drainage systems	Power outages from primarily winter storms were seen as one of the most prevalent hazard related problems for the region. Structural actions for maintaining critical facility power and maintaining right of ways were ranked high by most communities. A number of communities also expressed the need to evaluate and establish better drainage systems to address stormwater issues.
Regional	1. Expand Regional Water Supply	All communities in the region ranked high having better regional water supply and distribution systems.
Jurisdictional	Varied	Additional mitigation actions added by communities included specific water system improvements, developing or expanding GIS systems, and establishing regional or Local Emergency Planning Commissions (LEPCs).

Section VII details the process each community plans to take to implement their mitigation actions listed in the Plan. In some cases, the mitigation actions listed are already underway in some form in the communities and will be integrated into existing plans and operations. This section also provides information about how each community adopted this Plan.

The Region 2000 Multi-Jurisdiction Hazard Mitigation Plan provides the region with a valuable tool to expand hazard mitigation and prepare communities to better address the impacts of hazards.



INTRODUCTION

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Local Mitigation Plans

§201.6 Local Mitigation Plans. The local mitigation plan is the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. Local plans will also serve as the basis for the State to provide technical assistance and to prioritize project funding.

(a) Plan requirement. (1) For disasters declared after November 1, 2003, a local government must have a mitigation plan approved pursuant to this section in order to receive HMGP project grants. Until November 1, 2003, local mitigation plans may be developed concurrent with the implementation of the project grant.

(2) Regional Directors may grant an exception to the plan requirement in extraordinary circumstances, such as in a small and impoverished community, when justification is provided. In these cases, a plan will be completed within 12 months of the award of the project grant. If a plan is not provided within this timeframe, the project grant will be terminated, and any costs incurred after notice of grant's termination will not be reimbursed by FEMA.

The purpose of the Region 2000 Regional Commission's Multi-Jurisdiction Hazard Mitigation Plan is to identify areas of concern from natural hazards in the region and describe how these concerns will be addressed through the implementation of mitigation actions. This plan satisfies section 322 requirements for local hazard mitigation planning. Appendix II-1 contains the Disaster Mitigation Act of 2000 (DMA2K) requirements.

Hazard mitigation is any sustained action taken to reduce or eliminate long term risk to life, property and the economy from a hazard event. In the past, federal legislation has provided primarily post-disaster funding for disaster relief, recovery, and some hazard mitigation planning. DMA2K is the latest legislation to address this planning process. DMA2K was enacted on October 10, 2000, when President Clinton signed the Act (Public Law 106-390). The new legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, this Act establishes a pre-disaster hazard mitigation program and new requirements for the national Hazard Mitigation Grant Program (HMGP). States and local governments are required to adopt hazard mitigation plans to maintain eligibility for pre-disaster and post-disaster federal hazard mitigation funding.



In accordance with the requirements of the DMA2K, a multi-hazard mitigation plan was prepared for the Region 2000 Regional Commission. By having the mitigation plan in place, the regional commission will be able to better understand local hazards and the risks posed by them. During plan development, the regional commission developed mitigation activities to lessen the impacts, and to acquire disaster-related grants in the aftermath of a disaster.

The Region 2000 Regional Commission, on behalf of its member jurisdictions, has developed this plan to serve as a guide to its jurisdictions when assessing potential vulnerabilities to natural hazards. When developing this plan, every effort was made to gather input from all aspects of the project area communities to assure that the results of this analysis will be as complete as possible. The planning area for this study includes the four counties, two cities, and five towns that make up the Region 2000 Regional Commission. The hazard mitigation plan only addresses natural hazards at this time, with a brief description of terrorism concerns in the region. Future updates of this plan will address these concerns.

Region 2000 Regional Commission was awarded a planning grant from Hurricane Isabel FEMA Hazard Mitigation Grant Program (HMGP) Virginia funds to develop this Plan. The grant application process was led by the Virginia Department of Emergency Management (VDEM), which provided valuable assistance to the Regional Commission throughout the planning process.

A committee was established to provide input to the planning process. The committee was made up of public representatives, private citizens, businesses, and organizations. Efforts to involve local and county departments, as well as other regional and community organizations that might have a role in the implementation of the mitigation actions or policies, included invitations to attend meetings and serve on the committee, e-mails of minutes and updates, and opportunities for input and comment on all draft deliverables.

The development of this plan is the collaboration of the efforts of state and local governments, emergency responders and public input. The members of the steering committee were able to provide feedback on the development of the mitigation plan. This effort pulls together many community initiated actions and serves as a sounding board for all the jurisdictions within the Region 2000 Regional Commission.



Plan Organization

The Region 2000 Regional Commission's Hazard Mitigation Plan is organized into six main sections. These sections being:

1. Community Descriptions

The *Community Descriptions* provides information on the geography and demographics of the region.

2. Planning Process

The *Planning Process* provides information on the makeup of the steering committee members, meetings for the committee members and public, and the steps taken to complete and adopt the mitigation plan.

3. Hazard Identification and Risk Assessment (HIRA)

The *HIRA* provides detailed descriptions and maps on how the region is impacted by various natural and man-made hazards.

4. Capability and Mitigation

The *Capability and Mitigation* section provides information on each community's rankings of mitigation actions and the capability to implement individual mitigation actions.

5. Plan Maintenance

The *Plan Maintenance* provides information on the region's ability to maintain and update the plan.

6. References

The *References* provides a listing of the different resources used in the development of this plan.

7. Appendices

The *Appendices* provides the figures, tables and reports that are referenced in the body of the plan.



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Community Profile

Region 2000 is a business-friendly region in the heart of Virginia, just three hours south of the Washington DC metro area. Communities that make up the Regional Commission include Amherst County, Bedford County, Appomattox County, Campbell County, Bedford City, Lynchburg City, and the towns of Altavista, Appomattox, Amherst, Brookneal and Pamplin City. The total population in 2000 of these communities was 220,600. Figure III-1 details the jurisdictions participating in the mitigation planning efforts.

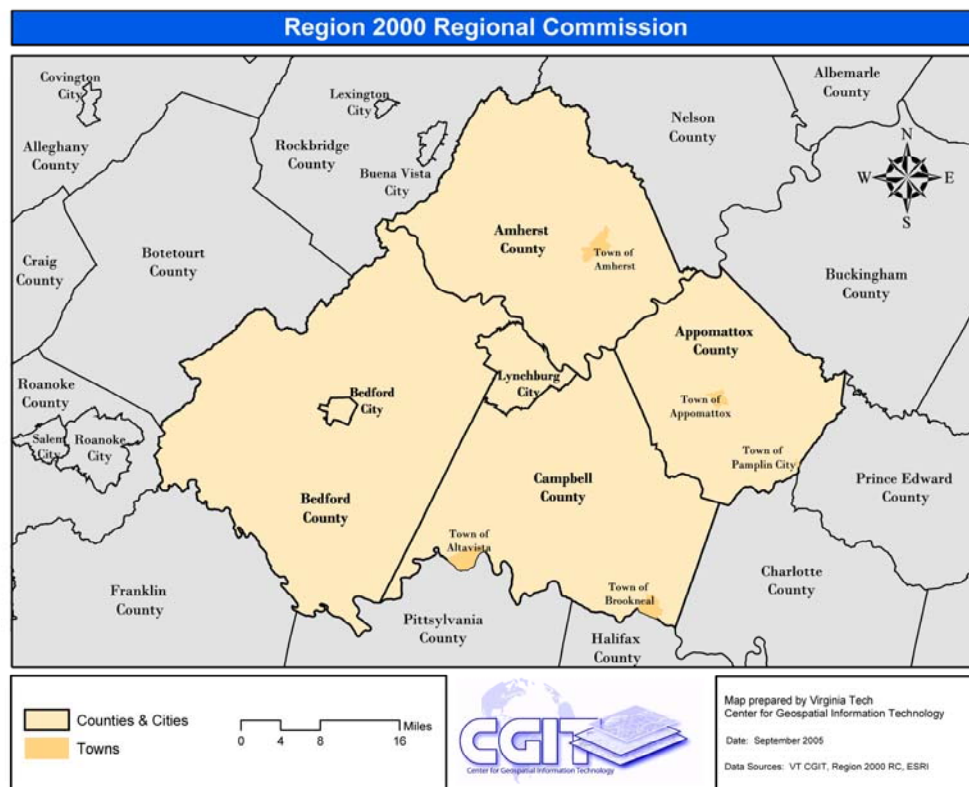


Figure III-1. Participating Jurisdictions.

Virginia Planning District Commissions (PDC) were formed in 1968 through the Code of Virginia. Title §15.2, labeled Counties, Cities and Towns of title §15.2 chapter 42 labeled Regional Cooperation Act (§15.2-4200 through §15.2-4222). The PDCs serve as a network in providing the Commonwealth with complete statewide coverage. PDCs were developed to provide both technical and service programs to the governments they serve.

In January 2001 the Central Virginia PDC was transformed into the Region 2000 Regional Commission. The main purpose of the commission is to provide economic



competitiveness on a regional scale, reduce redundancy in government, improve efficiency, enhance services, and improve implementation time for regional projects.

The region's two major U.S. highways are 29 and 460. The highways have become corridors for most of the industrial, commercial, and residential development. Primary economic categories in the region include higher education, wireless technology, manufacturing automation, nuclear energy, plastics, pharmaceuticals, and health care. Region 2000 belongs to one of the technology councils making up the Virginia Technology Alliance. The region is rich in civil war history, with battlefields, historical parks, and museums found throughout. Climate in the region is mild, with average January and July temperatures at 35°F and 71°F and annual rainfall and snowfall at 40" and 21" respectively.

Amherst County

Amherst County is located near the geographic center of Virginia just north of the city of Lynchburg. The county was created in 1761 from Albemarle County, named for Major General Jeffery Amherst a hero of the battle of Ticonderoga. It is bounded on the northwest by Rockbridge County, to the south and southwest by Bedford County, Campbell County and the City of Lynchburg and on the northeast by Nelson County. The James River borders the county on the south and east with the crest of the Blue Ridge Mountains forming the western Boundary.

Amherst County had a 2000 population of 31,894. Half the population is located in the south central portion of the county near the City of Lynchburg and around Madison Heights. The Town of Amherst was incorporated in 1910 and is situated on the topographic divide separating Tribulation Creek and Rutledge Creek. The Town of Amherst serves as the county seat. As of the 2000 census, the town had a total population of 2,251. Sweet Briar College, private women's liberal arts and science college, enrolls approximately 700 students. The college, founded in 1901, encompasses 3,250 acres located in the foothills of the Blue Ridge Mountains.

Elevations ranging from 500 feet to 4,000 feet provide the County with spectacular rolling countryside.

National Flood Insurance Program

Amherst County entered into the National Flood Insurance Program (NFIP) on July 17, 1978 with emergency entry on March 1, 1974. The current effective date for the FIRMs is July 17, 1978. They are currently in good participating standing with the program. The county has 38 flood policies in force with \$1,246,823 losses paid. Amherst County plans to continue NFIP compliance.

The Town of Amherst entered into the NFIP November 2, 1977 with emergency entry on February 7, 1974. The current effective date for the FIRMs is November 2, 1977. They are currently in good participating standing with the program. The town has 2 flood



polices in force with \$128,029 losses paid. The Town of Amherst plans to continue NFIP compliance.

Land Use

Woodlands cover approximately three-fourths of the land, and most of the northwestern portion of the county is part of the George Washington National Forest. US highway 29 corridor in the eastern region of the county has become the focal point for most commercial, industrial and residential development, especially near Lynchburg City.

Appomattox County

Appomattox County is located at the geographic center of Virginia. The lack of efficient communication and the need for localized service initiated the formation of the county by an act passed on February 8, 1845. This act designated that Buckingham, Prince Edward, Charlotte and Campbell counties each would give portions of their lands as of May 1, 1845. The county consists of 343 square miles of gently rolling terrain indicative of Virginia's Piedmont Region. Appomattox County is perhaps best known in history as the site of the end of the Civil War at Appomattox Court House.

The county is bordered to the north by Amherst County, Buckingham County and Nelson County, to the south by Charlotte County, to the east by Prince Edward County and Campbell County to the west. The James River serves as the northwest border. The towns of Pamplin and Appomattox are within the county, with the Town of Appomattox being the county seat. The 2000 population of Appomattox County was 13,705, up 11.4% from the 1990 US Census.

Elevations range from 460 feet to 1,151 feet above sea level. Drainage is provided by the James River, Appomattox River, Roanoke River Drainage Area and Bent and Wreck Island Creeks.

National Flood Insurance Program

Appomattox County entered into the NFIP on July 17, 1978 with emergency entry on February 11, 1974. The current effective date for the FIRMs is July 17, 1978. They are currently in good participating standing with the program. The county has 6 flood polices in force with \$253,216 losses paid. Appomattox County plans to continue NFIP compliance.

The Town of Appomattox entered into the NFIP on May 25, 1984 with emergency entry on February 22, 1974. The current effective date for the FIRMs is May 25, 1984. They are currently in good participating standing with the program. The town has 0 flood polices in force. The Town of Appomattox plans to continue NFIP compliance.

The Town of Pamplin City entered into the NFIP on February 12, 1976 with emergency entry on November 11, 1974. There were no FIRMs developed for Pamplin City. They



are currently in good participating standing with the program. The town has 0 flood polices in force. The Town of Pamplin City plans to continue NFIP compliance.

Land Use

Commercial forestland comprises more than half of the county's land area and a large portion of the rest of the county is crop and pasture lands. This natural resource base has helped foster a significant forestry, wood products, and furniture industry. Most of the commercial, industrial, and residential development exists along US 460 in central and southeastern portions of the county between Lynchburg City and the Town of Appomattox.

Bedford City

In 1782 the Town of Liberty was incorporated into Bedford County, and in 1890 changed its name to the Town of Bedford. In 1912, the town became known as Bedford City. The city is situated on U.S. Route 460 in the center of Bedford County and serves as the county seat. Its 6,300 residents enjoy living in a small city with the convenience of being strategically located between the cities of Lynchburg and Roanoke, the largest cities in Central Virginia. The cities most popular attraction is the National D-day Memorial, in honor of the 19 “Bedford Boys” who died in the first minutes of the Normandy landings at Omaha Beach.

National Flood Insurance Program

Bedford City entered into the NFIP on June 1, 1978 with emergency entry on March 12, 1974. The current effective date for the FIRMs is April 2, 1992. They are currently in good participating standing with the program. The county has 3 flood polices in force with \$0 losses paid. Bedford City plans to continue NFIP compliance.

Land Use

The city includes 6.77 square miles in Virginia’s Western Piedmont area, surrounded by mountains and beautiful Smith Mountain Lake to the South. Most of the land use is low intensity residential, pastures, and forest, with commercial and industrial development stretching along the 460 corridors in central and southern portions of the city.

Bedford County

Bedford County consists of 764 square miles located in west-central Virginia just east of the Roanoke metropolitan area. Bedford County was formed in 1754 and named for the Fourth Duke of Bedford, a British Government official. In 1839, the Town of Liberty (now City of Bedford) was established within the county limits. The scenic Blue Ridge Mountains make up the county's western border. The James River forms the northeast boundary. The 23,400-acre Smith Mountain Lake is situated to the south on the Roanoke River. Communities bordering Bedford include Rockbridge County to the northwest, Amherst County to the north and northeast, Campbell County to the east, Pittsylvania County to the south and Franklin, Roanoke and Botetourt Counties to the west.



As of 2004, the population of Bedford County is 62,700. The area has a rolling to hilly terrain with elevations from 800 feet to 4,200 feet above sea level, including the famous Peaks of Otter, Sharp Top and Flat Top, along the Blue Ridge Parkway on the county's western boarder.

National Flood Insurance Program

Bedford County entered into the NFIP on September 29, 1978 with emergency entry on January 16, 1974. The current effective date for the FIRMs is June 29, 1979. They are currently in good participating standing with the program. The county has 85 flood polices in force with \$155,431 losses paid. Bedford County plans to continue NFIP compliance.

Land Use

The majority of Bedford County land use is forest and pastures, with commercial, industrial, and residential development focused in Bedford City and along Routes 460 and 221. Strategically located between the metropolitan areas of Lynchburg and Roanoke, the county is home to a diversified industrial base and displays an appealing quality of life. The good mix of industry, commerce and agriculture ensures a strong, diversified economy and a positive business climate. Most of the residential growth occurs near Smith Mountain Lake and Lynchburg City.

Campbell County

Campbell County is located in the south-central Piedmont Region of Virginia, in the foothills of the Blue Ridge Mountains. From its beginnings in 1781 as a frontier settlement, to its emergence as a tobacco producer and then a center for industrial manufacturing, Campbell County has continually evolved and grown with national and world changes. The county is bordered on the north by the city of Lynchburg and the James River and in the South by the Roanoke (Staunton) River. Campbell County is 115 miles west of Richmond, the state capital; 200 miles southwest of Washington, DC; and 200 miles west of Norfolk.

The Town of Brookneal, near Phelps Creek and Falling River, has been a center for commerce for the surrounding counties of Campbell, Charlotte, and Halifax since it's founding in 1802. The unincorporated Town of Rustburg serves as the county seat. Altavista is a relatively new town in southern Campbell County, incorporated in 1912. Residential and industrial growth occurred within the town boundaries until around 1960, after which the concentration of new development took place outside the boundaries. Campbell County is included in the Lynchburg Metropolitan Statistical Area (MSA) and had a 2003 population of 60,800.

National Flood Insurance Program

Campbell County entered into the NFIP on October 17, 1978 with emergency entry on December 27, 1973. The current effective date for the FIRMs is April 17, 1984. They are



currently in good participating standing with the program. The county has 11 flood polices in force with \$501,008 losses paid. Campbell County plans to continue NFIP compliance.

Town of Altavista entered into the NFIP on August 1, 1978 with emergency entry on February 19, 1974. The current effective date for the FIRMs is April 11, 1980. They are currently in good participating standing with the program. The county has 14 flood polices in force with \$50,215 losses paid. Town of Altavista plans to continue NFIP compliance.

Town of Brookneal entered into the NFIP on March 1, 1978 with emergency entry on January 15, 1974. The current effective date for the FIRMs is January 18, 1980. They are currently in good participating standing with the program. The county has 4 flood polices in force with \$0 losses paid. Town of Brookneal plans to continue NFIP compliance.

Land Use

The majority of the county land use is a combination of forest, pastures, and farmland. Commercial and residential development is found near Lynchburg, in the towns of Brookneal and Altavista, and along Routes 29 and 501. Four-lane primary highways and rail service provide access to markets in the eastern portion of the county. Industrial activity in the county has concentrated around the towns of Brookneal and Altavista and the northern portion of the county close to Lynchburg.

Lynchburg City

The city of Lynchburg is located near the geographic center of Virginia. In 1757, John Lynch established a ferry service on the James. The ferry service remained profitable for many years, and by the end of the American Revolution, the village at Lynch's Ferry had itself become an important center of trade. Lynch saw the possibilities of establishing a town on the hill overlooking the ferry site, and in late 1784 petitioned the General Assembly of Virginia for a town charter. In October, 1786, the charter was granted, founding the town of Lynchburg.

Located on the James River, the city has a land area of 48 square miles and is bordered on the west by the Blue Ridge Mountains and Bedford County, to the south by Campbell County, and to the North by Amherst County. The city has a population of 64,108 and is a major highway and transportation hub that has contributed to its status as a broadly diversified manufacturing center. Lynchburg is 115 miles west of Richmond, the state capital; 52 miles east of Roanoke; 180 miles southwest of Washington, D. C.; and 200 miles west of the Port of Hampton Roads. Lynchburg is the central city of the Lynchburg Metropolitan Statistical Area (MSA), which has a total population of 203,000. Liberty University, a private coeducational Christian university, enrolls over 7,000 students residually and over 10,000 students in distance learning. The university, founded in



1971, encompasses 4,400 acres located in the foothills of the Blue Ridge Mountains and south of the James River.

National Flood Insurance Program

Lynchburg City entered into the NFIP on September 1, 1978 with emergency entry on September 18, 1973. The current effective date for the FIRMs is November 16, 1983. They are currently in good participating standing with the program. The county has 92 flood polices in force with \$3,195,912 losses paid. Lynchburg City plans to continue NFIP compliance.

Land Use

Most of the city is low intensity residential, with commercial and industrial development focused in eastern portions of the city in the downtown region and along US Highways 460 and 501. The region's overall quality of life is tied directly to the health of the city's economy. The city keeps pace with changes in technology and telecommunications, attracting national and international businesses and fusing the local and regional market with the nation and the world.

Plan Linkage

The Region 2000 Regional Commission encompasses a unique combination of both rural and urban life. This distinctive mix lent itself nicely in establishing the Region 2000 Steering Committee for the development of the All-Hazard Mitigation Plan. Section IV on the Planning Process details the development of the committee and meetings held during the plan development.



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Funding and Coordination

§201.6 (a)(3): Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan. Statewide plans will not be accepted as multi-jurisdictional plans.

§201.6 (b) Planning Process. An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

- (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
- (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
- (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

§201.6 (c) Plan Content. The plan shall include the following:

- (1) Documentation of the planning process used to develop the plan, including how it was prepared, who was involved, and how the public was involved.

Region 2000 Regional Commission applied for and was successful in obtaining FEMA Hazard Mitigation Grant Program (HMGP) planning funds that were made available from Hurricane Isabel in 2003. The preparation of this plan at the regional level was decided as the most cost and time effective solution for consistent and full coverage of the localities in Region 2000 Regional Commission. Appendix IV-1 includes the memorandums and letters from VDEM regarding funding and guidance for the region.

In February 2004, the Region 2000 Regional Commission began coordination with the counties of Amherst, Appomattox, Bedford, cities of Bedford and Lynchburg and the towns of Altavista, Brookneal, Amherst and Pamplin City to develop and implement their hazard mitigation plan. Appendix IV-2 contains the Letters of Intent that were signed by the participating localities.



Steering Committee

This planning process began by developing the Hazard Mitigation Steering Committee composed of representatives from the 11 jurisdictions (Table IV-1). Deputy Director for the Region 2000 Regional Commission, Robert White, presided over of the planning efforts for the region. An important component to the beginning stages of this plan was to determine support from external sources, engaging public support and involvement, and evaluating the resources needed to develop and carry out the plan. Participating affiliates for this process included Region 2000 partnerships, local government officials, public representatives, businesses, citizens, and organizations. The steering committee decided early on that they would need outside assistance with plan development and contracted with the Virginia Tech Center for Geospatial Information Technology (CGIT) for this assistance. CGIT provided the region with meeting facilitation, collecting and developing data for hazard identification and risk assessment, meeting federal requirements for the mitigation plan efforts, submission to VDEM and FEMA and development and production of the mitigation plan.



Table IV-1. Steering Committee Members

Steering Committee Members		
Name	Jurisdiction	Department
Robert Murphy	Amherst County	Public Safety
Jack Hobbs	Amherst, Town of	Town Manager
Bobby Wingfield	Appomattox County	E911 Coordinator
David Garrett	Appomattox, Town of	Town Manager
Robert Mitchell	Pamplin City, Town of	Town Mayor
Bart Warner	Bedford City	Director of Planning Community Development
Brent Wills	Bedford County	Natural Resources Administrator
Peter Dalton	Bedford County	Natural Resources Administrator
Christin Anthony	Campbell County	Public Safety
Daniel Witt	Altavista, Town of	Assistant Town Manager
J. Michael Crewes	Brookneal, Town of	Public Works Director
R. Les Puckett	Lynchburg City	Emergency Service Coordinator
Barry Martin	Lynchburg City	Emergency Communications Administrator
Sidney Franklin	Lynchburg City	Assistant Director Public Works
Robert White (Committee Chair)	Region 2000 Regional Commission	Deputy Director



Timetable of Meetings

More than thirty meetings were held throughout the planning process. The core steering committee met frequently to provide input on the progress of the plan. Data development meetings were held for the Region and also at each jurisdiction. Three main types of meetings were held throughout the development of the plan. Meeting types include steering committee meetings, jurisdictional meetings, and public input meetings. These three types are listed below and have been further broken down by type and in parentheses the numbers of each type held.

I. Steering Committee Meetings (12)

- Hazard Mitigation Training (1)
- Plan Progress (6)
- Data Development (1)
- HIRA Presentation (2)
- Mitigation Strategies (2)

II. Jurisdictional Meetings (9)

- Data Development (3)
- Action Development (6)

III. Public Input Meetings (13)

- Data Development (1)
- HIRA Findings and Input (1)
- Plan Presentation and Adoption (11)



Appendices IV-3 through IV-5 provide the agendas, dates and jurisdictions represented at the various steering committee meetings. Table IV-2 gives a summary of the number of meetings attended by the different jurisdictions. Every locality involved provided feedback and helped to mold the plan into what they needed. A hazard mitigation brochure was developed for the region and distributed at the various meetings (Appendix IV-6). This brochure provided the public and stakeholders with an overview of what hazard mitigation is, why they should participate, the steps needed to complete the process, and a timeline for the Region 2000 hazard mitigation plan completion.



Table IV-2. Jurisdictional Participation.

Community	Number of Meetings Attended
Amherst County	10
Amherst, Town of	6
Appomattox County	11
Appomattox, Town of	3
Pamplin City, Town of	11
Bedford City	6
Bedford County	9
Campbell County	13
Altavista, Town of	13
Brookneal, Town of	5
Lynchburg City	14
Region 2000 Regional Commission	13

Steering Committee Meetings

Frequent steering committee meetings provided a forum for exchanging ideas and receiving feedback from the different localities. Table IV-3 provides a listing of the different meetings held, and a brief description of the topics discussed. Appendices IV-3 through IV-5 provide a more detailed account of who attended and the meeting agendas.

Table IV-3. Steering Committee Meetings

Steering Committee Meetings	
Date	Topic(s)
1/21/2004	Establishing the Steering Committee
1/21/2004	Working Group Meeting; Roles of the Steering Committee
2/12/2004	Guidelines to developing the Plan
6/2/2004	CGIT (consultant) introduced; Beginning to develop the plan
8/24/2004	Hazard Mitigation Training Workshop
10/20/2004	Data needs; establishing contacts
12/15/2004	Data development; Preliminary HIRA findings
1/26/2005	HIRA Presentation
2/15/2005	HIRA findings and comments
5/12/2005	Developing Mitigation Actions
7/14/2005	Final steps in the Mitigation Plan. Adoption & Maintenance
3/15/2006	Final steps in the Mitigation Plan. Sample public notices and resolutions.

Jurisdictional Meetings

Jurisdictional meetings provided an opportunity for round-table discussions with the individual communities. Two main jurisdictional meetings were, 1. Data Gathering and 2. Action Development. Table IV-4 provides an outline of the communities involved.



Appendices IV-3 through IV-5 provides a more detailed account of who attended and the meeting minutes.

Table IV-4. Jurisdictional Meetings

Jurisdictional Meetings	
Date	Topic(s)
1/21/2005	Region 2000 Data Needs & Gathering
2/1/2005	Campbell County, Town of Altavista, and Town of Brookneal Data Needs & Gathering
3/11/2005	Lynchburg City Data Needs & Gathering
5/17/2005	Campbell County, Town of Altavista, and Town of Brookneal Action Development
5/24/2005	Bedford County Action Development
5/24/2005	Bedford City Action Development
5/25/2005	Appomattox County, Town of Appomattox, and Town of Pamplin City Action Development
6/1/2005	Amherst County and Town of Amherst Action Development
6/8/2005	Lynchburg City Action Development

Public Input

Public input was received in a variety of methods. Three main types of public input meetings were held, 1.) Data Gathering, 2.) HIRA Presentation and 3.) Plan Adoption. The Region 2000 hazard Mitigation Website was made available to the public to check progress of the plan and to provide feedback on the plan. Table IV-5 provides a brief outline of the three types of meetings held. Appendices IV-3 through IIV-5 provide a more detailed account of who attended and the meeting minutes. Public input and participation was encouraged throughout the planning process.

Table IV-5. Public Input Meetings

Public Input Meetings	
Date	Topic(s)
12/14/2004	Public Data Needs & Gathering
3/31/2005	HIRA Presentation
5/9/2006	Town of Altavista Resolution
4/18/2006	Amherst County Resolution
5/10/2006	Town of Amherst Resolution
4/15/2006	Appomattox County Resolution
5/23/2006	Town of Appomattox Resolution
5/8/2006	Bedford County Resolution
6/13/2006	Bedford City Resolution
5/9/2006	Town of Brookneal Resolution
5/1/2006	Campbell County Resolution
6/1/2006	Town of Pamplin City Resolution
5/25/2006	Lynchburg City Resolution

The first public meeting was in the form of a data gathering and development meeting, held at the Lynchburg Public Library. The public was given an overview of the mitigation planning process and asked to provide feedback on the types of data they have available and on areas within the region they felt were concerns or “problem spots”.



Public and private organizations were invited to attend the public data needs and gathering meeting. Appendices IV-3 through IV-5 and IV-7 include the list of attendees, meeting agenda, list of those invited and the letter sent welcoming public input. The different organizations represented at the data meeting include:

- I. US Coast Guard Auxiliary
- II. Southside Electric Corporation
- III. Kinetic Resources
- IV. City Schools
- V. MIA-COM Incorporated
- VI. BGF Industries
- VII. Campbell County Sheriff's Office (2)
- VIII. Sweet Briar College
- IX. Lynchburg Police Department
- X. Lynchburg Fire Department

Jurisdictional data meetings were held to get a sense of the types of data that the communities have in addition to their data needs. Depending on the levels of data the communities had, this was collected and incorporated into the planning efforts.

Press releases were issued for the Public Meeting held on March 31, 2005. Appendices IV-3 through IV-5 includes the list of attendees and the agenda. The different organizations (17) represented at the public presentation on the hazard identification and risk assessment meeting include:

- I. City of Lynchburg Public Officials (3)
- II. Region 2000 Public Officials (2)
- III. Appomattox County Public Officials (4)
- IV. Campbell County Public Officials (2)
- V. Town of Altavista Public Officials (1)
- VI. American Red Cross (1)
- VII. Amherst County and Town Public Officials (2)
- VIII. United Way I&R (1)
- IX. Private Citizens (1)

The public was given a Hazards Survey where they could comment on the HIRA findings as well as providing additional input for the plan. The HIRA was posted to the Region 2000 Hazard website (<http://www.cgis.vt.edu/region2000/index.asp>) for public exposure and input. These comments were reviewed and incorporated into the plan when appropriate. Involvement of non-profit and government agencies helped to add another dimension to this planning effort.

Neighboring planning districts were given an opportunity to review and comment on the draft mitigation plan. The draft was posted to the Region 2000 Hazard website and a



letter was sent out to the head of each of the planning districts with instructions on how to view the plan and provide feedback. This letter is included in Appendix IV-11. These comments were reviewed and, as appropriate, were incorporated into the plan.

Neighboring Planning Districts:

- I. Commonwealth Regional Council
- II. Southside PDC
- III. West Piedmont PDC
- IV. Roanoke Valley – Allegheny RC
- V. Central Shenandoah PDC
- VI. Thomas Jefferson PDC

Prior to the plan approval, public input was received during the meeting prior to each jurisdictional board meeting. Public hearing notices (Appendix IV-12), by each jurisdiction, were issued for the purpose to receive comments on the Hazard Mitigation Plan. Drafts of the plan were made available to the public through the Region 2000 hazard mitigation website and in some communities copies were posted in the County Administrator's office. Any comments received by the public were documented by the jurisdictions and will be incorporated into future revisions of this plan.

Development of the Plan

The next phase involved performing assessments of natural and manmade hazard vulnerabilities within the Region 2000 boundaries. Data for critical hazards within the region was collected and analyzed to identify the relative ranking of each hazard and delineate areas of highest concern. Evaluation of each hazard involved assessing the risks and vulnerabilities of public and private buildings, facilities, utilities, communications, transportation systems, and other critical infrastructure, and determining estimated losses that would occur if the given hazard were to impact the region.

Upon completion of hazard assessments, hazard mitigation plans and strategies were developed for the region with an emphasis on developing disaster prevention and preparedness programs and actions to reduce the impact of natural and manmade disasters. This involved determining hazard mitigation priorities and developing mitigation strategies to avoid or minimize substantial human and economic costs of each disaster. In the development of the mitigation plan many resources were used to develop the actions for the various regions. The steering committee members were able to provide CGIT with information obtained from Emergency Operations Plans (EOPs), Zoning, Jurisdictional manuals and capital improvement plans. The information provided by the communities was used in the development of the HIRA and mitigation actions.



Multi-Jurisdictional Plan Adoption

In order to receive plan approval, each jurisdiction must formally adopt the hazard mitigation plan. Plan adoption is in the form of a resolution and has been adopted at each community's board meetings (local governing body). See Appendix IV-13 for each jurisdiction's resolution.

Plan Linkage

The *Planning Process* should not be seen as an independent step in the development of the Hazard Mitigation Plan, but as a continual process that is integral in the entire plan. The planning process documents the steps taken in establishing the FEMA grant and steering committee through to the adoption.

Section V on the *Hazard Identification and Risk Assessment (HIRA)* uses the information gathered at the steering committee meetings, jurisdictional meetings and public input meetings. The information and data that was provided was then supplemented to create the HIRA for Region 2000. The HIRA outlines the hazards and vulnerabilities that impact the region.



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Introduction

§201.6(c)(2) A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. The risk assessment shall include:

(i) A description of the type, location, and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

(ii) A description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. The plan should describe vulnerability in terms of:

- (A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;
- (B) An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate;
- (C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

(iii) For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

FEMA State and Local Mitigation Planning how-to guides defines the risk assessment as “the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural hazards.”

The purpose of the HIRA is to:

1. Identify what hazards that could affect the Regional Commission
2. Profile hazard events and determine what areas and community assets are the most vulnerable to damage from these hazards
3. Estimate losses and prioritize the potential risks to the community



The first step, identify hazards, will determine all the natural hazards that might affect the area. The hazards will be ranked to determine what hazards are most likely to impact the communities of Region 2000. Hazards that are determined to have significant impact will be analyzed in the greatest detail to determine the magnitude of future events and the vulnerability for the community and the critical facilities. Hazards that receive a moderate impact ranking will be analyzed with available data to determine the risk and vulnerability to the specified hazard. The limited impact hazards will be analyzed using the best available data to determine the risk to the community.

Regional Information

Table V-1 and Figure V-1 illustrate the land area of each of the communities in the regional commission, as well as the population in the communities and number of households. This information will prove to be a key component in determining the risk to communities from natural hazards.



Region 2000 Regional Commission
Multi-Jurisdictional Hazard Mitigation Plan
HIRA Section

Table V-1. Region 2000 Planning District Commission Demographics (from US Census Bureau).

NAME	Area (Sq Mile)	2000 Pop	2000 Pop per Sq Mile	Median Home Value	Total Housing Units
Amherst County	471.17	31,894	67.69	\$88,800	12,958
Amherst, Town of	4.9	2,251	459.39	\$101,400	1,000
Appomattox County	329.41	13,705	41.6	\$81,600	5,828
Appomattox, Town of	2.1	1,761	838.57	\$76,900	767
Pamplin City, Town of	0.25	199	796	\$55,500	89
Bedford City	6.79	6,299	927.69	\$90,400	2,702
Bedford County	757.02	60,731	80.22	\$127,000	26,841
Campbell County	499.2	51,078	102.32	\$96,900	22,088
Altavista, Town of	4.8	3,425	713.54	\$78,000	1,650
Brookneal, Town of	3.6	1,259	349.72	\$53,900	580
Lynchburg City	48.97	65,269	1,332.84	\$85,300	27,640

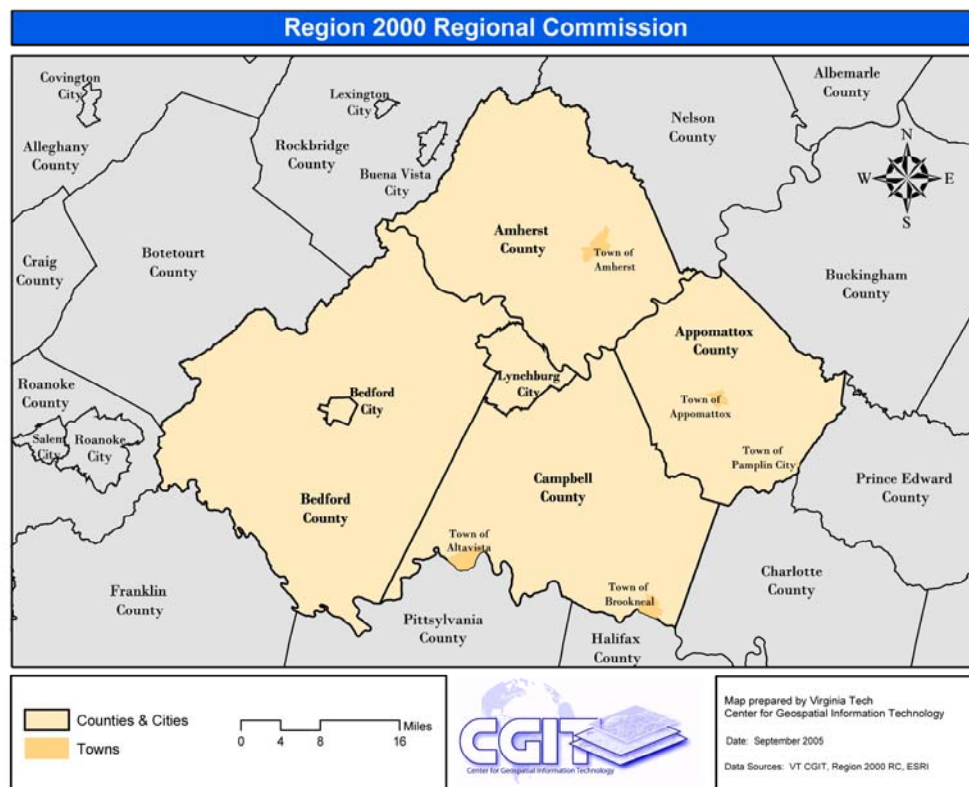


Figure V-1. Region 2000 RC Boundaries



Watersheds

The major watersheds for the Region 2000 RC include the James River Basin and the Roanoke River Basin. The following Figure V-2 illustrates the location of the major watershed boundaries for the planning commission. The region is separated by two major watersheds, the James River Basin to the north and the Roanoke River Basin to the south.

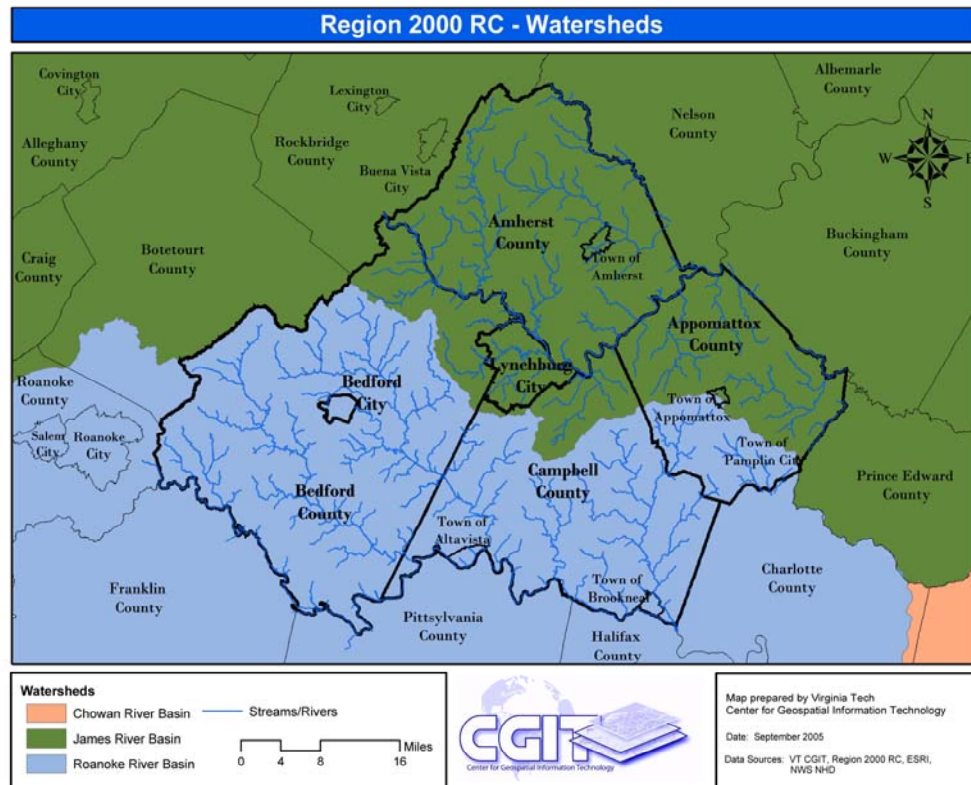


Figure V-2. Region 2000 RC Watersheds (from VA-DCR).

Critical Facilities

According to the FEMA State and Local Plan Interim Criteria, a critical facility is defined as a facility in either the public or private sector that provides essential products and services to the general public, is otherwise necessary to preserve the welfare and quality of life in the County, or fulfills important public safety, emergency response, and/or disaster recovery functions.

Critical facilities for Region 2000 Regional Commission were derived from a variety of sources. Information provided by the communities was supplemented with ESRI data, FEMA HAZUS-MH location data and additional facilities located using GIS by the Virginia Tech Center for Geospatial Information Technology (CGIT). A complete and



comprehensive database of critical facility information does not exist for this region. Hopefully, with updates of this plan, this information will be developed and used. Figure V-3 shows the locations of critical facilities in the regional commission.

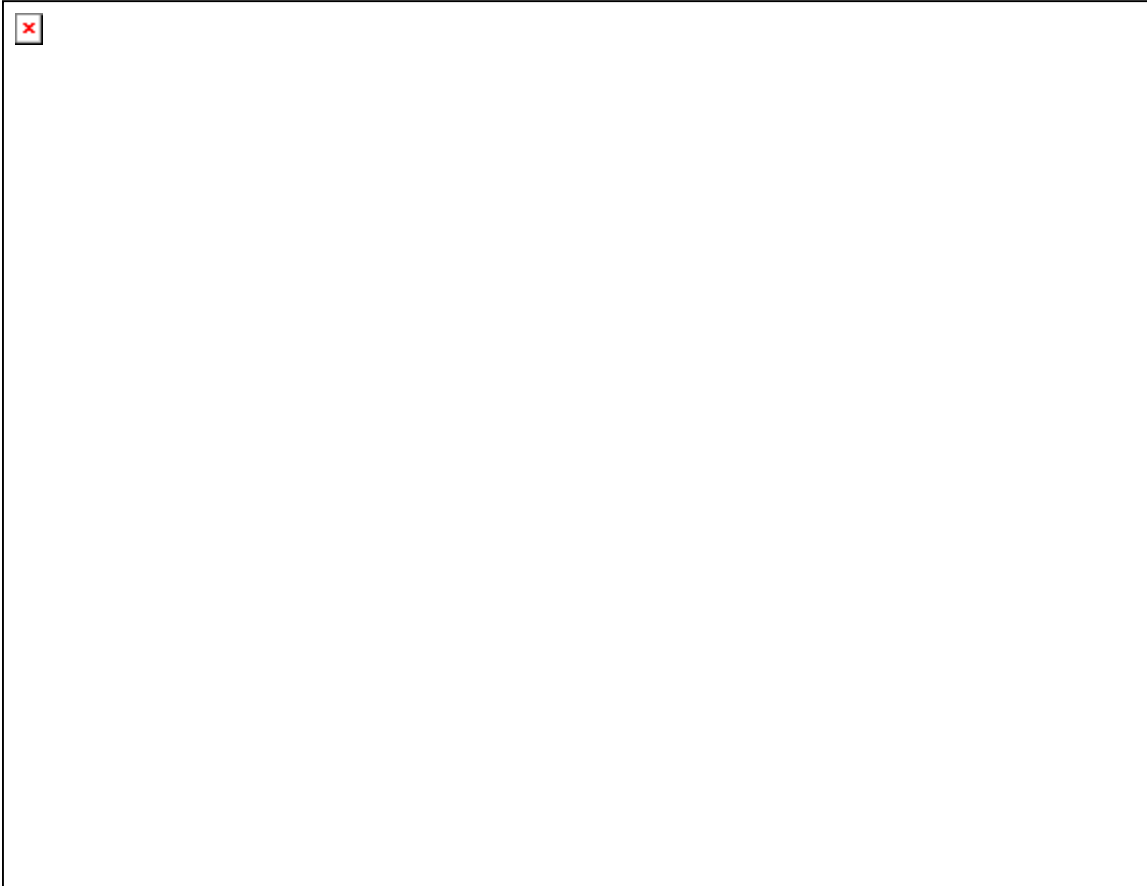


Figure V-3. Region 2000 RC Critical Facility locations.

Data Limitations

Inadequate information posed a problem for developing loss estimates for most of the identified hazards. The limiting factor for the data was that the hazard mapping precision is at only the county or jurisdiction level. Many of the hazards do not have defined damage estimate criteria.

Analysis for the region was completed using the best available data. The detail level of the data received from the communities drove the specifics of the vulnerability analysis. When detailed building footprint data was available, it was used to assess the vulnerability at a building specific level. When building specific data was not available, census blocks were used to assess the areas vulnerability to specific hazards. Flooding analysis was conducted using two main methods. When communities provided real estate property values and building footprints, a detailed analysis was completed to determine the percent of property at risk. When real estate values were not readily available, 2000 Census data for average structure value per block was used as a replacement cost in the



event of a disaster. This value can serve as a guide in assessing the impacts of various hazards. Dams or hazmat locations, when available, were included in with critical facilities and analysis preformed.

The FEMA guidelines emphasize using “best available” data for this plan. The impact of these data limitations will be shown through the different vulnerability assessments and loss estimation methods used for hazards. ***In the HIRA sections on each hazard, more detail will be provided on the data and analysis limitations.***

The Regional Commission, as well as the localities, provided available base map data and building information for the analysis. All other data was derived from existing sources or created by the CGIT.

Critical facilities were determined based on best available data. Critical facilities, residential and industrial buildings within the 100 year floodplain were identified for flood analysis and wildfire analysis. The HAZUS-MH model was used to estimate damage from hurricanes in the region and is detailed in the hurricane section. Terrorism was addressed through consulting community Emergency Operations Plans, if available, for more detailed information.



Hazard Identification

Types of Hazards

While nearly all disasters are possible for any given area in the United States, the most likely hazards to potentially affect the communities in the Region 2000 Regional Commission generally include:

- Droughts
- Earthquakes
- Flooding (Hurricanes)
- Hurricanes
- Landslides and Land Subsidence
- Terrorism
- Wildfires
- Wind (Hurricane/Tornado)
- Winter Storms (Ice/Snow)

Probability of Hazards

Hazards were ranked by the steering committee to determine what hazards they judged to have the largest impact on their communities. The results are summarized in Table V-2. Certain hazards were not addressed as a result of the infrequency of occurrence and/or limited impact. Earthquake, for example, falls into this category. The type of analysis that was completed was determined by the type of data available and the scale of data available for the analysis.

Table V-2. Region 2000 Regional Commission Hazard Ranking Results.

Hazard Identification Results	
Hazard Type	Rank
Winter Storms (Ice/Snow)	High
Flood (Hurricane)	High
Drought	High
Wind (Hurricane/Tornado)	Medium
Wildfire	Medium
Landslide and Land Subsidence	Low
Terrorism	Low
Earthquake	None



Major Disasters

Table V-3 lists the major disasters that have occurred in the Planning District including Presidential declared disasters. From the table, it is shown which hazards impacted each of the communities in the commission, and the designated federal disaster number. The region has had 9 declared disasters since 1969, with a majority of the disasters being split between flooding and with winter weather. Nine declared disasters have been noted for the time period prior to 1969, when FEMA began to denote disasters with declaration numbers. For a detailed description of the disaster for the region, consult the *Hazard History Tables* at the beginning of each hazard section.

Table V- 3. Region 2000 RC Federal Disasters

Communities Impacted	Federal Date	DR#	Federal Description
Amherst, Appomattox, Lynchburg	1771	N/A	Severe Storms & Flooding
Amherst, Appomattox, Lynchburg	1870	N/A	Severe Storms & Flooding
Amherst, Appomattox	1877	N/A	Severe Storms & Flooding
Appomattox	1877	N/A	Severe Storms & Flooding
Amherst, Appomattox	1913	N/A	Severe Storms & Flooding
Amherst, Appomattox	1935	N/A	Severe Storms & Flooding
Amherst, Appomattox, Bedford, Bedford City	1936	N/A	Severe Storms & Flooding
Campbell	1937	N/A	Severe Storms & Flooding
Amherst, Appomattox, Bedford, Bedford City, Campbell	1940	N/A	Severe Storms & Flooding
Amherst, Bedford, Bedford City, Campbell, Lynchburg City	8/23/1969	274	Severe Storms & Flooding (Hurricane Camille): This major storm made landfall out of the gulf as a category 5 and weakened to a tropical depression before reaching the state. Precipitation trained over regions many hours, dropping more than 27 inches of rain in Nelson County and over ten inches in the area from Lynchburg to Charlottesville. Flooding and landslides, triggered by saturated soils, resulted in catastrophic damage. More than 150 people died and another 100 were injured. At the time, damage was estimated at more than \$113 million.
Amherst, Appomattox, Bedford, Bedford City, Campbell, Lynchburg	6/23/1972	339	Tropical Storm Agnes: This event produced devastating flooding throughout the Mid-Atlantic States. Some areas of eastern Virginia received over 15 inches of rainfall as the storm moved through. The Potomac and James Rivers experienced major flooding, which created 5 to 8 feet flood waters in many locations along the rivers. Richmond was impacted the most by these high water levels. Water supply and sewage treatment plants were inundated, as were electric and gas plants. Only one of the five bridges across the James River was open, while the Downtown area was closed for several days and businesses and industries in the area suffered immense damage. Sixteen people lost their lives in the state and damage was estimated at \$222 million. These startling numbers resulted in 63 counties and 23 cities qualifying for disaster relief.



Region 2000 Regional Commission
Multi-Jurisdictional Hazard Mitigation Plan
HIRA Section

Communities Impacted	Federal Date	DR#	Federal Description
Amherst, Appomattox, Bedford, Campbell	4/11/1994	1021	Severe Winter Ice Storm: This winter storm coated portions of Virginia with 1 to 3 inches of ice from freezing rain and sleet. This led to the loss of approximately 10 to 20 percent trees in some counties, which blocked roads and caused many people to be without power for a week. There were numerous automobile accidents and injuries from people falling on ice. Damages were estimates at \$61 million.
Amherst, Bedford, Bedford City, Campbell, Lynchburg	7/1/1995	1059	Severe Storms & Flooding
Amherst, Appomattox, Bedford, Campbell, Lynchburg City	1/13/1996	1086	Blizzard of 1996 (severe storm): Also known as the "Great Furlough Storm" due to Congressional impasse over the federal budget, the blizzard paralyzed the Interstate 95 corridor, and reached westward into the Appalachians where snow depths of over 48 inches were recorded. Several local governments and schools were closed for more than a week. The blizzard was followed with another storm, which blanketed the entire state with at least one foot of snow. To compound things, heavy snowfall piled on top of this storm's accumulations in the next week, which kept snow pack on the ground for an extended period of time. This snow was eventually thawed by higher temperatures and heavy rain that fell after this thaw resulted in severe flooding. Total damage between the blizzard and subsequent flooding was over \$30 million.
Amherst, Appomattox, Bedford, Bedford City, Campbell, Lynchburg	9/6/1996	1135	Hurricane Fran: This hurricane is notable not only for the \$350 million in damages, but because of its widespread effects, including a record number of people without power and the closure of 78 primary and 853 secondary roads. Rainfall amounts between 8 and 20 inches fell over the mountains and Shenandoah Valley, leading to record-level flooding in many locations within this region. 100 people had to be rescued from the flood waters and hundreds of homes and buildings were damaged by the flood waters and high winds.
Amherst, Appomattox, Bedford, Campbell, Lynchburg	2/28/2000	1318	2000 Winter Storms
Bedford, Bedford City, Lynchburg City	5/5/2002	1411	2002 Floods/Tornadoes



Communities Impacted	Federal Date	DR#	Federal Description
Amherst, Appomattox, Bedford, Bedford City, Campbell, Lynchburg City	9/18/2003	1491	Hurricane Isabel: Hurricane Isabel entered Virginia September 18 after making landfall along the North Carolina Outer Banks. The Commonwealth sustained tropical storm winds for 29 hours with some maximum winds approaching 100 mph. The hurricane produced storm surge of 5 to 8 feet along the coast and in the Chesapeake Bay with rainfall totals between 2 to 11 inches along its track. Twenty-one inches of rainfall was measured near Waynesboro Virginia. Damages due to wind, rain, and storm surge resulted in flooding, electrical outages, debris, transportation interruption, and damaged homes and businesses. At the height of the incident approximately 6,000 residents were housed in 134 shelters and curfews were imposed in many jurisdictions. Further damages occurred when a series of thunderstorms and tornados came through many of the designated areas in the southeast portion of Virginia on September 23. There were a total of 36 confirmed deaths. More than 93,000 registrations were made for assistance. Residential destruction included 1,186 homes reported destroyed and 9,110 with major damage, with total losses estimated over \$590 million. Of the 1,470 businesses involved, 77 are reported destroyed, 333 suffered major damage and 1,060 businesses suffered minor or casual damage, with losses exceeding \$84 million. Public assistance exceeds \$250 million and continues to increase. More than two-thirds of the households and businesses within the Commonwealth were without power. Remote locations did not have power restored for three weeks.

Mapping Considerations

Level of Hazard Mapping

Table V-4 provides a breakdown of the natural hazards addressed in this plan. The level of planning consideration given to each hazard was determined by the committee members. Based on the input of committee members, the hazards were broken into three distinct categories which represent the level of consideration they will receive throughout the planning process.

In order to focus on the most critical hazards that may affect the Planning District communities, the hazards assigned a level of *High* or *Medium* will receive the most extensive attention in the remainder of the planning analysis, while those with a *Low* planning consideration level will be assessed in more general terms. Those hazards with a planning level of *None* will not be addressed in this plan. The level of *None* should be



interpreted as not being critical enough to warrant further evaluation; however, these hazards should not be interpreted as having zero probability of impact.

As can be seen in Table V-2, earthquakes have been designated with a hazard level of *None*, and will not be included in this analysis. An earthquake is the shaking of the ground's surface caused by movements of the plates beneath it. Though there have been historical occurrences of earthquakes that have affected the area, the probability and impact is low enough for the overall risk to be considered "none" at a planning level. This reasoning is supported by a loss estimate created using FEMA's HAZUS-MH. This estimate shows annualized losses for the region to be about \$669,000. This number is compared to annualized losses from wind events at \$1,419,730.

Problem Spot Mapping

Additional areas of impact were noted by the committee members through a problem spot worksheet, as well as indicating what areas were of concern on paper maps for the region. Each locality provided input, to the best of their ability, in determining what areas were concerns or "problems" in their communities. Multiple forums were used to develop a complete list of problem spot areas, including taking comments at three steering committee meetings, at the public data gathering meeting, and at the public HIRA meeting. The areas that the committee members and public indicated were taken into consideration during the analysis phase. The individual community problem spot maps (Appendix V-1) that were developed, based on community and public input, are:

Flooding

Amherst County
Bedford County
Campbell County
Altavista, Town of
Lynchburg City

Winter Storm

Amherst County
Bedford City
Lynchburg City

Wind

Lynchburg City

Thunderstorms

Bedford County

Landslide

Amherst County
Bedford Country



Table V-4. Region 2000 RC Natural Hazards HIRA Overview

Hazard	Type	Detail Level	Analysis Level	Data Reference
Blizzards/ Winter Storms	Including winter storms, ice storms, and excessive cold	High	Covered by HIRA blizzards/winter storm analysis	NOAA National Weather Service Records, VirginiaView PRISM, Climate Source
Flooding	Riverine	High	Covered by HIRA flood analysis	FEMA DFIRM, Q3, and FIRM Mapping
Drought	Including excessive heat	High	Covered by HIRA drought analysis	Drought Monitor Task Force, Water Systems
Wind	Hurricane	Medium	Covered by HIRA hurricane analysis	FEMA DFIRM, Q3, and FIRM Mapping and ASCE Design Wind Speed Maps, FEMA HAZUS-MH model
	Tornado	Medium	Description and Regional Maps	NOAA National Weather Service Records
Wildfire	Wildfire	Medium	Covered by HIRA wildfire analysis	Virginia Department of Forestry
Landslide/Land Subsidence	Landslide/Land Subsidence	Low	Description and Regional Maps	USGS
Terrorism	Terrorism	Low	Description	Addressed in community Emergency Operation Plans (EOP)
Earthquake	Earthquake	None	None, due to infrequency of occurrence	FEMA HAZUS-MH



Severe Winter Storm (High Ranking)

Hazard History

Table V-5 includes descriptions of major winter storm events in the Region 2000 RC. Events have been broken down by the date of occurrence and when available, by individual community descriptions. As Table V-3 illustrates, a large percentage of the region's federal declared disasters were due to severe winter weather. When no community specific description is available, the general description should be used as representing the entire planning area.

Table V-5. Winter Storm Hazard History

Date	Damages
June 1, 1993	70+ winds knocked down trees and power lines. Two million dollars worth of damages.
December 20, 1993	A winter storm passed through the region, surprising the area with up to six inches of snow. Dozens of minor accidents were reported, but no power outages. The heavier snow was concentrated in Amherst, Appomattox and Campbell counties.
December 28, 1993	A thin layer of ice covered roads and sidewalks and shut down government and private businesses in Lynchburg and the surrounding counties for 1-2 days.
February 11, 1994	<p>More than four inches of ice and sleet covered the entire region, knocking out heat and electricity for over 40,000 homes and businesses. The ice also caused numerous structural leaks. The ice storm was followed by rain, causing flooded basements and standing water on roadways. The damage exceeded \$25 million in Central Virginia. Schools were closed for 3 to 5 days.</p> <p>Amherst County: Ice storm was in February 11-13- declared in April --Matt recorded this event. 2.6 million dollars in estimates from the federal government and city estimates.</p> <p>Bedford County: Damages totaled just over \$1 million. Mayor Shelton declared a local emergency due to fallen trees and power outages. Almost the entire county was without power for over a day. About \$50,000 damage was reported alone from a car-transport truck sliding into another vehicle and off the road on U.S. 460 at Blue Ridge Avenue.</p> <p>Campbell County: Utility damage was estimated at \$5 million; agricultural losses were estimated at \$320,000.</p> <p>Lynchburg City: Storm damage estimates surpassed \$19 million. A large tree fell and crushed a car at Lynchburg College and a small section of roof collapsed at K mart under the weight of the ice. Rivermont Ave, Boonsboro Rd, Langhorne Rd, Old Forest Rd, and Hollins Mill Rd were all completely blocked by downed trees. Four schools were used as shelters for those without power. Almost 7,000 residents were without power for over five days.</p>



Date	Damages
January 30, 1995	Six to eight inches of snow fell across the region, catching the area by surprise. Most schools and offices were closed. Appomattox man killed on 460 in Campbell County during snow storm. Temperatures dropped into the 20s with wet roads beginning to freeze. VDOT crews scattered about 500 tons of sodium chloride on the roads. Five inches of snow fell between Friday and Monday, with nine inches on the Blue Ridge parkway.
December 7, 1995	Six to eight inches of snow fell across the region, catching the area by surprise. Most schools and offices were closed. Lynchburg City: Lynchburg General Hospital reported several snow-related accidents.
December 30, 1995	Five inches of snow fell between Friday and Monday, with nine inches on the Blue Ridge parkway. Appomattox man killed on 460 in Campbell County during snow storm. Amherst County: Temperatures dropped into the 20s with wet roads beginning to freeze. VDOT crews scattered about 500 tons of sodium chloride on the roads.
January 6, 1996	Winter weather brought snow and high winds to central Virginia, with expected snowfalls to reach 18-24 inches. Lynchburg City: Snowfall by Sunday (January 7) reached 2.5 inches
January 12, 1996	More snowfall in Central Virginia caused road crews to work overtime. Government offices opened one hour late. Lynchburg City: snowfall accumulation reached 2.7 inches
January 19, 1996	Heavy rains, melting snow, and high winds Friday morning shut down schools, closed roads, and flooded low-lying areas. Problems continued when the James River crested downstream from Lynchburg through Amherst and Nelson Counties. Bedford County: Portions of US 460 near Montvale were closed from flooding. Small trees were felled with no injuries were reported. The James River crested upstream from Lynchburg near Big Island, flooding portions of Georgia-Pacific paper mill. Lynchburg City: City officials evacuated residential roads near the James River. Residents on Hydro Street and Ruesens Road were also evacuated. Houses along Timberlake Drive suffered minor flood damages. Town of Altavista: Lynch Creek flooded portions of Pittsylvania Avenue, Main Street, and 7 th Street. The Altavista Life Saving building as well as Shreve Park and War Memorial Park suffered water damage. Schools were closed due to dangers of flash flooding.



Date	Damages
February 3, 1996	<p>Snow continued to fall in Central Virginia, with snowfalls estimated around 13-24 inch totals. Snowfall in surrounding counties reported snowfall totals of 10-14 inches. Wind chill brought temperatures down to 15-25 degrees below zero.</p> <p>Lynchburg City: snowfall reported at 11.4 inches.</p> <p>Appomattox County: snowfall totaled 9 inches</p> <p>Amherst County: All roads in Amherst were impassable.</p>
February 9, 1996	<p>Icy roads caused dozens of accidents Friday morning.</p> <p>Amherst County: schools closed on Friday.</p> <p>Lynchburg: 16 vehicle accidents reported.</p>
February 16, 1996	<p>Eight inches of snowfall on Friday pushed Lynchburg City seasonal totals to 51.2 inches, a record. Snow closed schools and roads in the area. Area counties appealed for waivers due to missed school days.</p>
March 7, 1996	<p>Lynchburg: Five inches of snow blanketed Lynchburg City on Thursday and Friday, raising the city's winter snowfall to 56.4 inches. A couple of minor injuries due to automobile accidents.</p>
April 10, 1997	<p>Hard freeze in Central Virginia caused damage to local peach and apple orchards. Temperatures dropped to 24 degrees F.</p>
December 27, 1997	<p>Moderate to occasionally heavy snow developed in southwestern Virginia during the early morning hours on the 27th and continued well into the evening hours. Snow accumulations were mostly from 4 to 7 inches. Hazardous road conditions resulted in numerous traffic accidents.</p>
December 29, 1997	<p>Moderate to occasionally heavy snow developed in southwestern Virginia during the early morning hours on the 27th and continued well into the evening hours. Snow accumulations were mostly from 4 to 7 inches. Area totals were 2 inches in Appomattox County, up to six inches in Lynchburg, Bedford, Campbell, and Amherst. Hazardous road conditions resulted in numerous traffic accidents.</p> <p>Lynchburg: On Lynchburg expressway, slick conditions cause problem southbound into the City between Main and Grace streets, also Langhorne Road north of Cranehill drive.</p>
January 15, 1998	<p>Freezing rain and freezing drizzle on the 15th resulted in ice buildup on trees in excess of one quarter inch in portions of Patrick, Henry, Floyd, Pulaski, Giles, Montgomery, Roanoke, Botetourt, Allegheny, Campbell, and Pittsylvania Counties. The weight of the ice broke off tree limbs and knocked down power lines.</p>
February 4, 1998	<p>Freezing rain and freezing drizzle from the early afternoon hours on the 4th through around noon on the 6th at elevations above 2800 feet resulted in major accumulations of ice on exposed objects. At elevations above 3600 feet, ice accumulations were up to 5 inches thick. The weight of the ice brought down power lines, power poles, and trees.</p> <p>Appomattox County: Few minor roads were closed</p> <p>Lynchburg: Minor flooding was reported. Winds and saturated ground caused trees to be knocked down, causing about 2,300 AEP customers to lose power.</p>



Date	Damages
December 23, 1998	<p>Sleet and freezing rain developed during the morning hours on the 23rd and continued into late afternoon hours. Freezing rain redeveloped overnight and continued into the late morning and early afternoon hours on the 24th. Ice accumulated from 1/4 to 1/2 inch on exposed objects in most areas. However, there were some ice accumulations around one inch. The weight of the ice downed trees limbs and power lines which resulted in numerous power outages. Some people were without power for a few days. Ice covered roads and bridges resulted in numerous traffic accidents and some injuries.</p> <p>Lynchburg: Sleet and freezing rain started after lunchtime in Lynchburg and wreaked havoc on rush-hour roadways through the area. State and local police reported dozens of wrecks throughout the region, including several on US 460 and US 29 that tied up rush hour traffic.</p>
January 25, 2000	<p>Snow developed around midnight on the 25th and ended around mid morning on the 25th. Snow accumulations ranged from 2 to 8 inches in Bedford and Henry counties, to 10 to 16 inches east of a line from Lynchburg to Danville.</p> <p>Appomattox County: Snow Totals: 6 to up to 10 inches; Worst since 1996. This surprise snow storm was called by a larger than normal Nor'easter which caused widely varying snowfall throughout the State. It took several days to clear roads, especially in Amherst, Appomattox, and Campbell Counties.</p> <p>Campbell County: Snow Totals: 7 to Up to 12 inches; hardest hit county in region; minor power outage in Concord.</p> <p>Lynchburg: Snow Totals: Up to 7 inches; Due to volume of snow city had to use contract labor for snow removal, where snow was dumped into the James River; minor power outage in Boonsboro area.</p>
February 22, 2001	<p>A burst of heavy snow during the morning of the 22nd accumulated from 2 to 4 inches resulting in hazardous travel conditions. The snowfall formed a dangerous icy sheet on roadways as it froze at sunset causing over 150 accidents in the area with no serious injuries.</p> <p>Lynchburg City: Accidents reports on Lynchburg Expressway near Stadium Road and 2312 Old Forest Road, and on US 501 on bridges near old forest road.</p>
January 2, 2002	<p>Snow developed during the late evening on the 2nd and accumulated 5 to 10 inches before ending midday on the 3rd. Campbell County received from 6 to 9 inches, while Altavista received 7 inches.</p> <p>Campbell County: Accidents from slick road included VA 40 east of Brookneal and on US 501 near Brookneal.</p>
January 19, 2002	<p>Snow developed during the morning of the 9th and accumulated 5 to 7 inches before changing to sleet and freezing rain, then ending late in the evening.</p>
December 4, 2002	<p>Snow during the afternoon of the 4th through early morning of the 5th accumulated from 5 to 10 inches across the area. Five inches of freezing precipitation covered the ground and roads in Lynchburg. Appomattox, Bedford and Campbell, Lynchburg and Amherst had totals varying from 4 to 6 inches. Numerous accidents were reported on snow and ice covered roads. Three car pileups on US 460 near Appomattox, US 501 in Lynchburg.</p>



Date	Damages
January 16, 2003	Snow accumulated 3 to 6 inches across northern Campbell County and Lynchburg, with over 60 automobile accidents reported. Major roads were clogged and traffic on highways, such as US 29 was Re-routed. An 8 car pileup was reported in the 1700 block of Wards Ferry Road.
January 30, 2003	Snow during the morning and afternoon of the 30th accumulated 4 to 7 inches across Bedford, Campbell, and Buckingham counties. Lynchburg: dumped snow up to 7 inches in the Lynchburg area.
February 6, 2003	Snow during the afternoon of the 6th through the early morning of the 7th accumulated from 5 to 8 inches. A few cars slid into ditches on wards ferry road.
February 15, 2003	Snow, sleet, and freezing rain fell from late on the 15th through much of the 17th. Ice accretions ranged from 1/4 to 1/2 of an inch. Snow and sleet accumulations ranged from 5 to 8 inches in the Allegheny Highlands and Appomattox and Buckingham Counties in the east. Virginia declared state of emergency - national guard brought in to help with snow removal. As of Sunday afternoon Campbell and Bedford received 1.5 inches of icy precipitation, Amherst county received 3 inches. Amherst county's primary and secondary roads were in severe condition.
February 26, 2003	Snow and ice developed during the late afternoon of the 26th and continued through the evening of the 27th. Ice accretion ranged from 1/4 of an inch to as much as an inch in southern Pittsylvania and Halifax counties downing numerous trees and power lines. In addition, snow fall amounts across Bedford, Campbell, and Appomattox Counties ranged from 4 to 6 inches. Lynchburg City: Lynchburg police reported 24 accidents and 14 disabled vehicles. Top 10 winters of all-time.
January 10, 2004	Small snow storm blankets central VA. Lynchburg received more than 2 inches of snow overnight.
January 25, 2004	A winter storm on the 25th dumped from 4 to 7 inches across Western Virginia. The higher amounts fell from Roanoke County southwest into portions of the New River Valley, with local higher amounts in portions of Campbell County, in the piedmont. Numerous accidents were reported, due to slick roads, but the majority across the region was minor. Lynchburg: Lynchburg police and surrounding counties reported accidents as conditioned worsened. Four inches of snow at the Lynchburg regional airport, this closed briefly.
February 15, 2004	A potent upper level storm system moved across North Carolina during the afternoon and evening of the 15th, moving off the coast early on the 16th. This storm brought a swath of heavy snow to a good portion of Western Virginia. Amounts ranged from 4 to 8 inches in a path from the Mountain Empire of Southwest Virginia, east to the Blue Ridge from Floyd County south to the North Carolina border, then east into the foothills and piedmont of southern Virginia. The highest amounts of 7 to 8 inches were reported in portions of Smyth, Wythe, Grayson, Floyd and Franklin counties. Campbell County: Numerous accidents. Some on the US 501 south of Rustburg. US 460.



Hazard Profile

Primary Impacts

The impacts of winter storms are minimal in terms of property damage and long-term effects. The most notable impact from winter storms is the damage to power distribution networks and utilities. Severe winter storms have the potential to inhibit normal functions of the community. Governmental costs for this type of event are a result of the needed personnel and equipment for clearing streets. Private sector losses are attributed to lost work when employees are unable to travel. Homes and businesses suffer damage when electric service is interrupted for long periods of time. Health threats can become severe when frozen precipitation makes roadways and walkways very slippery, due to prolonged power outages, and if fuel supplies are jeopardized. Occasionally, buildings may be damaged when snow loads exceed the design capacity of their roofs or when trees fall due to excessive ice accumulation on branches. The primary impact of excessive cold is increased potential for frostbite, and potentially death as a result of over-exposure to extreme cold.

Secondary Effects

Some of the secondary effects presented by extreme/excessive cold are a danger to livestock and pets, and frozen water pipes in homes and businesses.

Predictability and Frequency

Winter storms can be a combination of heavy snowfall, high winds, ice and extreme cold. These are classified as extra-tropical cyclones that originate as mid-latitude depressions. Winter weather impacts the state of Virginia between the months of November and April, with varied intensities from east to west. In order to create a statewide winter weather hazard potential map that captures this variability, gridded climate data was obtained from the Climate Source and through the VirginiaView program. This data was developed by the Oregon State University Spatial Climate Analysis Service (SCAS) using **PRISM** (Parameter-elevation **R**egressions on **I**ndependent **S**lopes **M**odel). This climate mapping system is an analytical tool that uses point weather station observation data, a digital elevation model, and other spatial data sets to generate gridded estimates of monthly, yearly, and event-based climatic parameters.

PRISM data was selected for this analysis because it is an interpolation system that incorporates elevation fluctuation into the regression equations that are used to predict the gridded variation of each climate parameter. This winter weather risk assessment uses monthly normal precipitation, mean annual days with snowfall greater than 1 inch, and mean monthly snowfall PRISM data to develop snow and ice potential maps for the state. These datasets have been generated to incorporate topographic effects on precipitation, capture orographic rain shadows, and include coastal and lake effect influences on precipitation and snowfall. The monthly precipitation grid provides a 30-year climatological average of total precipitation in inches. The mean monthly snowfall grid



provides a 30-year climatological average depth of freshly fallen snow in inches. The mean annual days map reveals the 30-year average of the number of days that a location will receive greater than 1 inch of snowfall in a 24 hour period in a given year.

A criterion of greater than 1 inch was selected for winter snowfall severity assessment because this depth will result in complete road coverage that can create extremely dangerous driving conditions and will require removal by the local community. This amount of snowfall in a 24 hour period can also lead to business closure and school delays or cancellation. Figure V-4 shows the average number of days with snowfall greater than one inch for the state and Figure V-5 shows the same for the Region 2000 RC; these can act as indicators of the likelihood of future occurrences. Average number of days with snowfall greater than one inch increases dramatically near the mountain ranges. In Region 2000 the Blue Ridge Mountains in the northern portions of Amherst and Bedford counties have the greatest amount of snowfall.

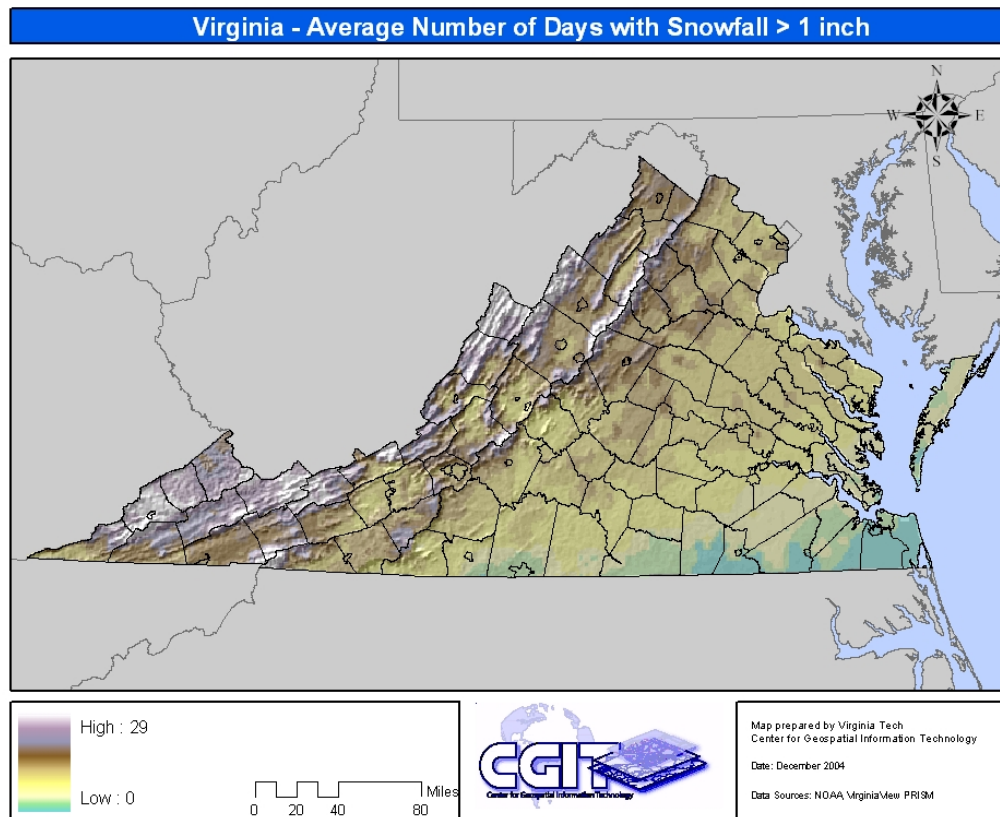


Figure V-4. Virginia Average Number of Days with Snowfall > 1 inch.

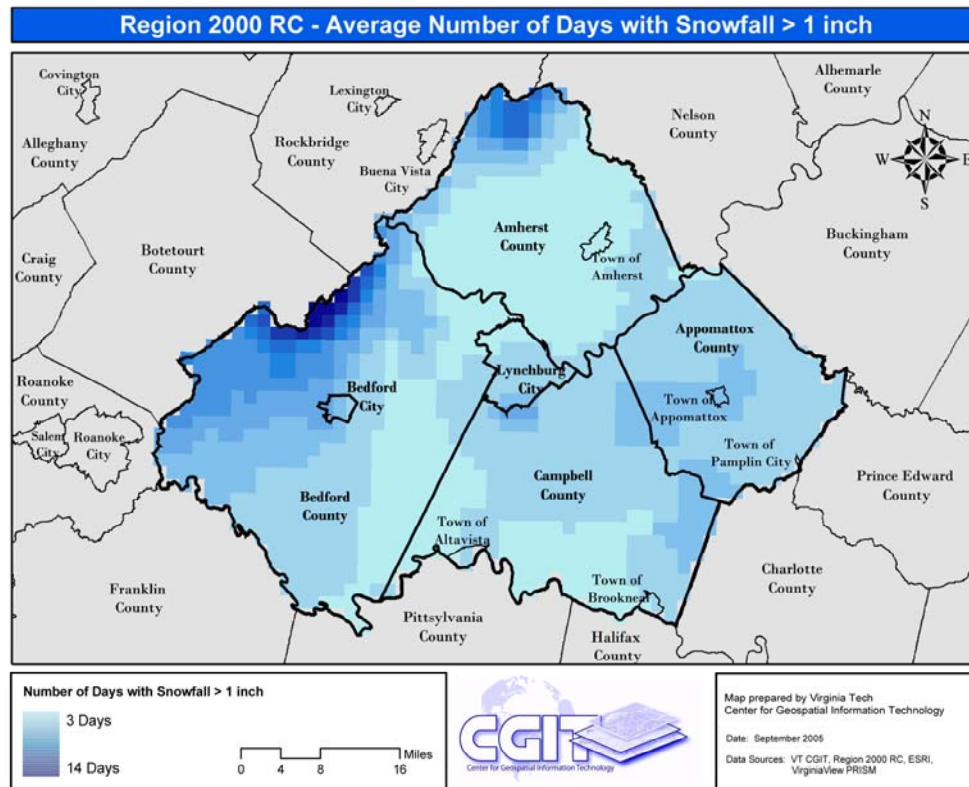


Figure V-5. Region 2000 RC Average Number of Days with Snowfall > 1 inch.



Ice Potential

Another challenge with winter weather in Virginia and in the region is the amount of ice that often comes as part of winter weather. Snowfall and ice potential are generated based on the percentage difference between the total precipitation from November to April and the corresponding liquid equivalent snowfall depth. Since snow falls in a frozen state, it does not accumulate on the surface the same way as rainfall would. In order to account for this difference, there are characteristic snow/rain relationships that have been created. For example a value of 1 would mean that all of the precipitation at the location falls as liquid rainfall, and a value of 0.5 would mean that half of the precipitation falls as liquid rainfall and half falls as frozen precipitation. It is assumed that the lower the percentage the greater potential that precipitation within these months is falling as snow. The values in the middle of the two extremes would represent regions that favor ice conditions over rain and snow. A five quantile distribution was applied to the output statewide grid to split the percentages into five characteristic climatological winter weather categories (snow, snow/ice, ice, rain/ice, and rain). Figure V-6 shows the statewide map and Figure V-7 shows the Region 2000 RC map; for likelihood of future occurrences. The trend of ice potential for the Commonwealth is snow in the mountains, in the northwest portion of the state and changing to rain as you approach the coastal southeast tip of Virginia. Region 2000 receives a winter mix of snow, ice and rain/ice. As Figure V-5 illustrates, the mountains in Amherst and Bedford Counties get a majority of the snow, while the southeast portion of the region receives a winter sleet mix.

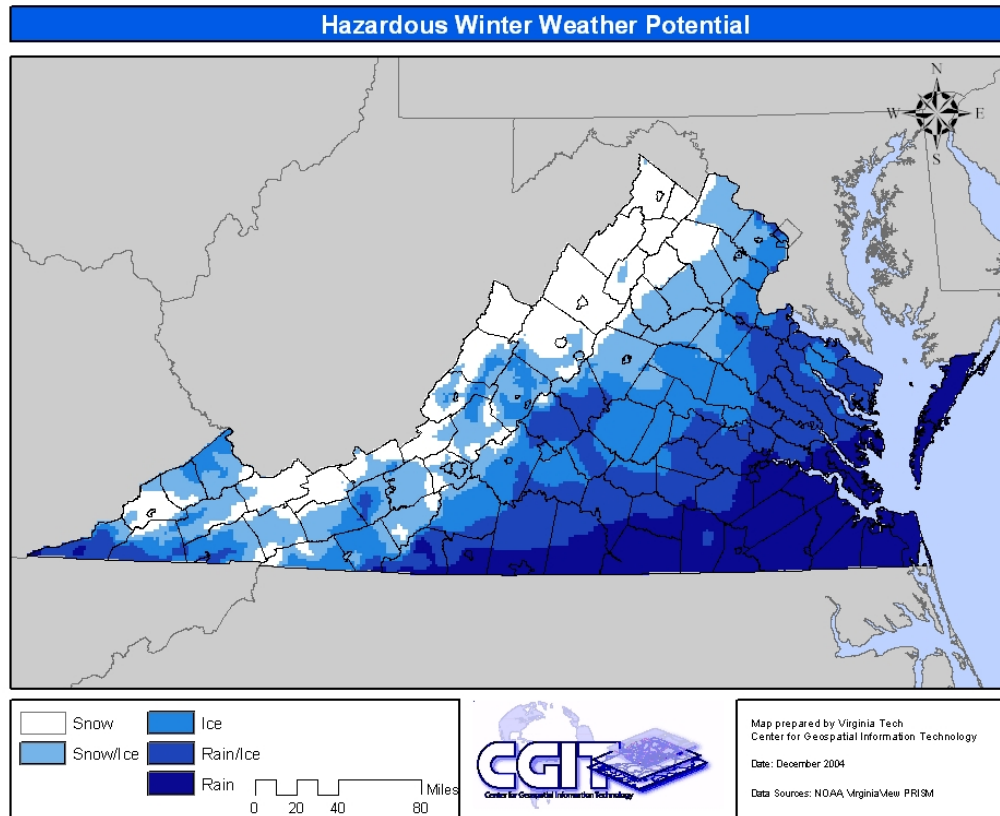


Figure V-6. Virginia Hazardous Winter Weather Potential Based on LEQ Precipitation.

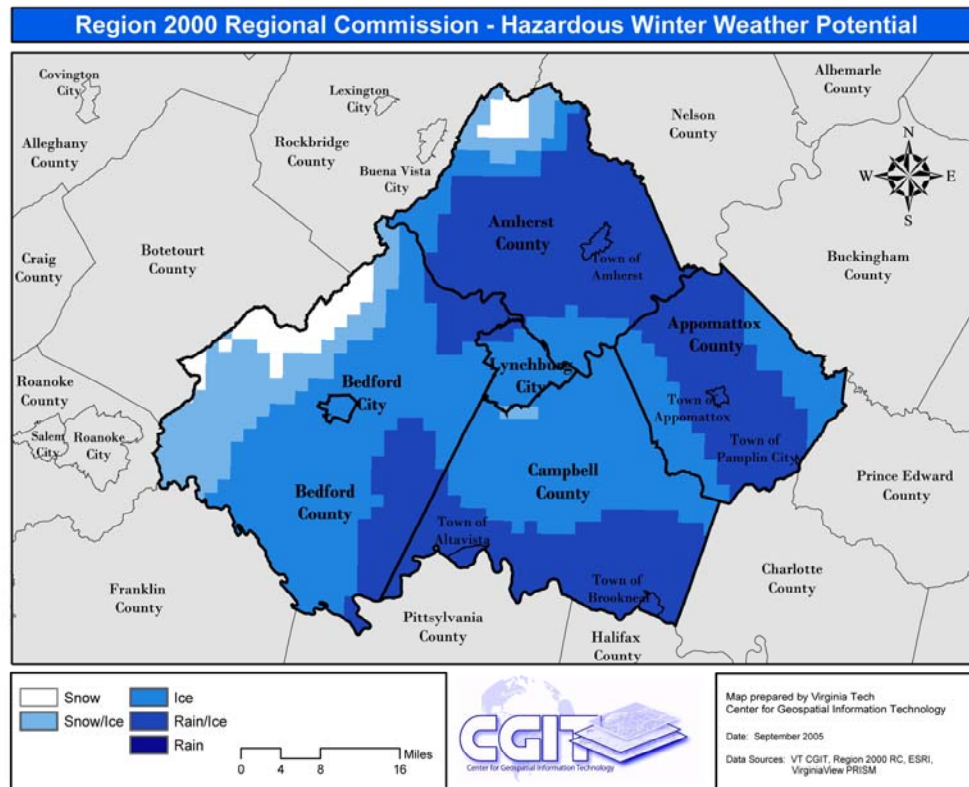


Figure V-7. Region 2000 RC Hazardous Winter Weather Potential Based on LEQ Precipitation.

Steep Slopes

Lack of extensive GIS data throughout the region limited any other additional winter storm vulnerability assessment except in Lynchburg. The Lynchburg City GIS department was able to provide detailed streets and terrain data that could be used to identify streets that would be of a higher risk during ice storm events. A GIS analysis was performed to identify streets throughout with slopes greater than 15%, which would have vehicle traction issues during ice storms. Table V-6 and Figure V-8 illustrate selected roadways in the City of Lynchburg that have greater than a 15% slope. These areas should be focused on as having higher potential accidents. The eastern portion of the city has a large amount of roads with greater than 15% slope.



Table V-6. Lynchburg City Steep Slope Locations (>15%).

Map Label	Block Number	Road Name	Slope (%)
1	500	Sandusky Dr.	15%
2	1700	Clayton Ave.	15%
3	130	Rockwell Rd.	15.3%
4	1400	Augusta St.	15.8%
5	N/A	Paxton Ave.	16.8%
6	2000	Rose St.	17.3%
7	1220	17th St.	18.3%
8	600	11th St.	18.5%
9	1700	Locust St.	18.6%
10	200	Polk St.	19.2%

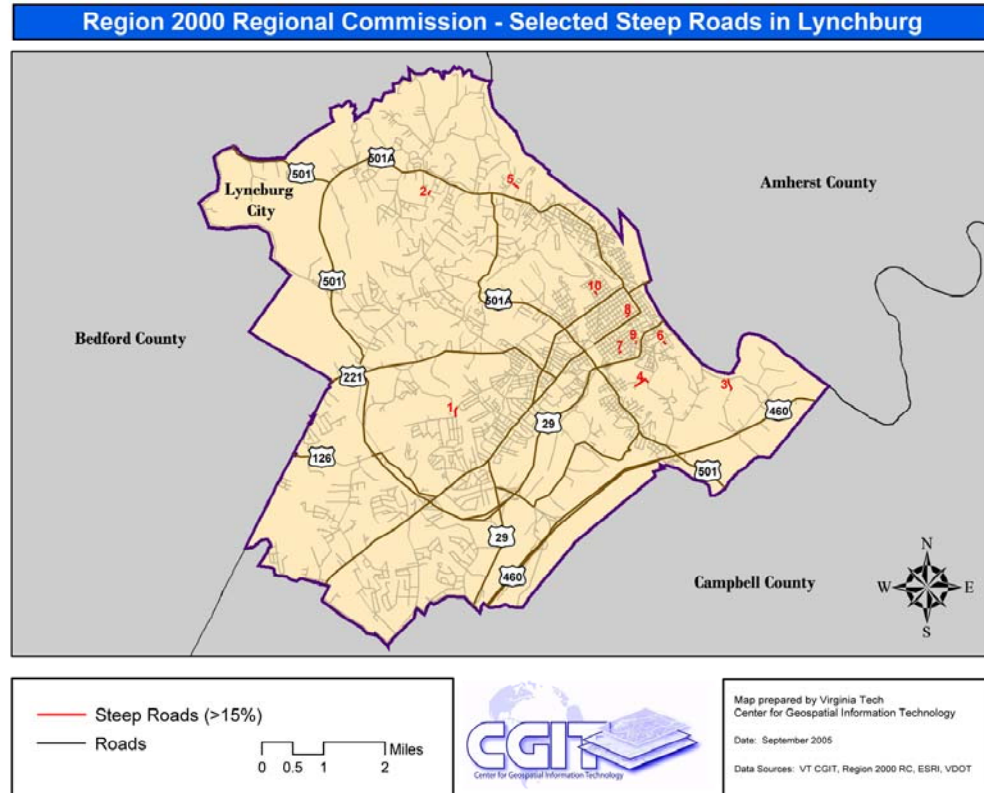


Figure V-8. Lynchburg City Steep Slope Locations (>15%).



Vulnerability Analysis

Figures V-6 and V-7 illustrate the overall winter weather and ice potential for the region. Figures V-9 and V-10 show relative risk or vulnerability based on these previous maps. These were developed by assigning a high risk to those census blocks within the regions with the greatest potential for snowy days (> 1 in of snow) or ice. Division into high, medium and low were based on the levels predicted from potential maps. Tables V-7 and V-8 show the population in each locality impacted by the overall snowfall and ice risks. Note Tables V-7 and V-8 indicate the town populations impacted; the county totals include the populations of the towns. Future revision of this plan will need to develop a method to calculate the potential loss from these winter storms.

Areas of high susceptibility for snowfall (Figure V-9) are centralized around the foothills of the Blue Ridge Mountains, with the highest snowfall risk around the Peaks of Otter in Bedford County. Relative ice potential (Figure V-10) for the region has a slightly different trend of potential risk. The northern portion of Amherst County follows a similar pattern as the snowfall risk. There is a band of high ice potential starting in Lynchburg City south into the majority of Campbell County and a southwest band of ice risk in Bedford County and City.

The winter weather mapping resolution does not support town based analysis, since most towns in Region 2000 would be represented by one or two pixels at this resolution. ***As weather data has better spatial resolution in the future, the ability to create practical town based analysis will be improved.*** While Tables V-7 and V-8 show town based vulnerability, the analysis method was designed to derive broad regional vulnerability comparisons, not pinpoint location comparisons. Also, the nature of winter storm preparedness and impact can not be represented with snow or ice potential maps. Even though Bedford County may receive more snow than other localities, they may have more VDOT and power companies resources prepared to address winter weather than other communities.

Appendices V-5A and V-5B contain the zoom-in maps for relative snowfall potential and relative ice potential for each of the localities in the region. The Appendix contains a full size map for the region, followed by the subsequent locality maps. The northern portion of Bedford County has the highest relative snowfall risk for the region. Relative ice risk for the region is scattered in each of the localities, with high potential being in the northern portion of Amherst County, Lynchburg City, northern Campbell County, southeast Bedford County and Bedford City. These maps were consulted during the mitigation action development for potential sites of future actions.

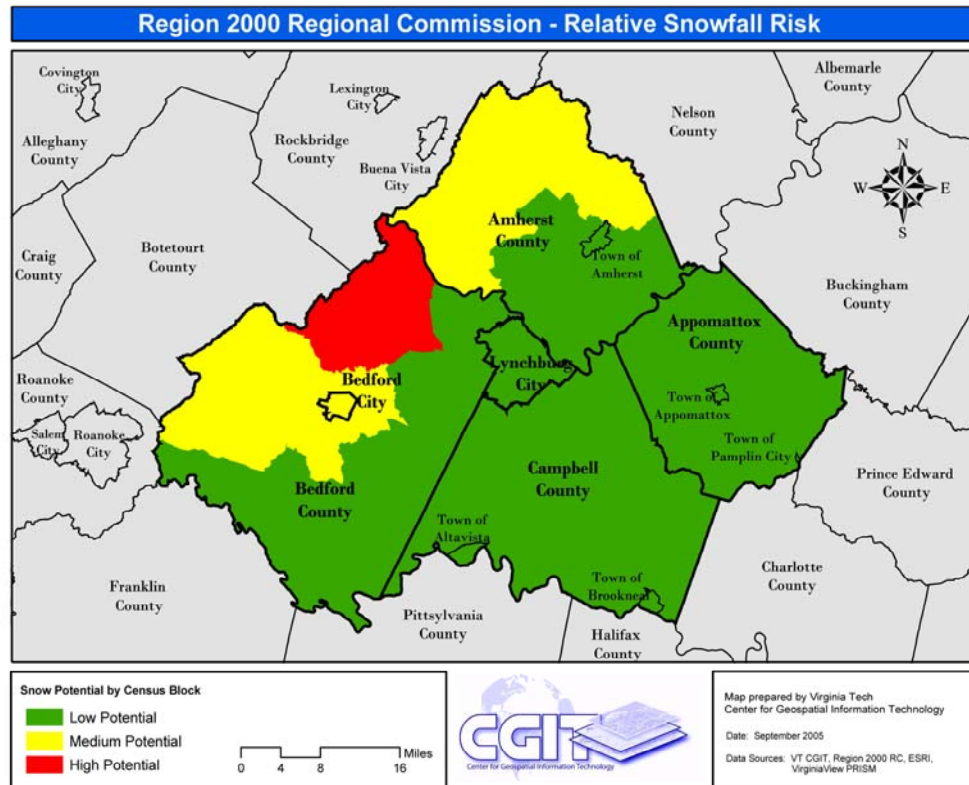


Figure V-9. Region 2000 RC Snowfall Relative Risk.



Table V-7. Region 2000 RC Population Snowfall Relative Risk (from 2000 Census). *denotes town values that are also included in totals for the perspective County.

Community	Low	Medium	High	Total
Amherst	27,741	5,061	0	32,802
*Amherst, Town of	2,251	0	0	2,251
Appomattox	14,068	0	0	14,068
*Appomattox, Town of	1,761	0	0	1,761
*Pamplin City, Town of	199	0	0	199
Bedford City	0	6,386	0	6,386
Bedford County	41,612	18,356	3,756	63,724
Campbell	51,078	0	0	51,078
*Altavista, Town of	3,425	0	0	3,425
*Brookneal, Town of	1,259	0	0	1,259
Lynchburg City	65,013	0	0	65,013
Total	200,382	29,803	3,756	233,941

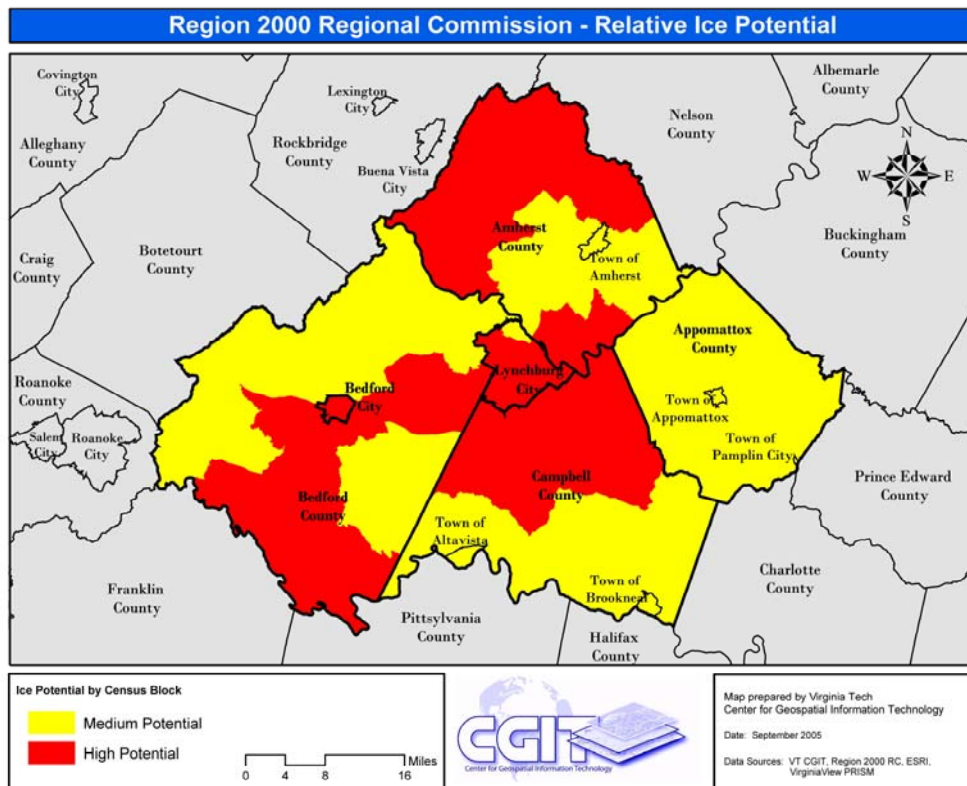


Figure V-10. Region 2000 RC Ice Relative Risk.



Table V-8. Region 2000 RC Population Ice Relative Risk (from 2000 Census). *denotes town values that are also included in totals for the perspective County.

Community	Low	Medium	High	Total
Amherst County	0	14,257	18,545	32,802
*Amherst, Town of	0	2,251	0	2,251
Appomattox County	0	14,068	0	14,068
*Appomattox, Town of	0	1,761	0	1,761
*Pamplin City, Town of	0	199	0	199
Bedford City	0	0	6,386	6,386
Bedford County	0	30,110	33,614	63,724
Campbell County	0	14,773	36,305	51,078
*Altavista, Town of	0	3,425	0	3,425
*Brookneal, Town of	0	1,259	0	1,259
Lynchburg City	0	4,774	60,239	65,013
Total	0	77,982	155,959	233,941

Problem Spot Mapping

See Appendix V-1 for Figures and Tables summarizing the problem spot locations that were denoted by the steering committee. These are areas of concern that were designated by the steering committee and public. When specific town information was provided it was included on the problem spot maps. If no information was provided by the localities, or they acknowledged there was no need for a specific map, the map was omitted from the Appendix.



Flooding (High Ranking)

Hazard History

Table V-9 includes descriptions of major flood events in the Region 2000 RC. Events have been broken down by the date of occurrence and when available, by individual community descriptions. When no community specific description is available, the general description should be used as representing the entire planning area. As Table V-3 demonstrates, a large percentage of the region's declared disasters were due to flooding.

Table V- 9. Flood Hazard History

Date	Damages
June 9, 1905	James River crested at 23 feet.
August 23, 1969	<p>Torrential rains resulting from the stalling of Hurricane Camille by a cold front caused record floods on the Piney, Pedlar and Buffalo Rivers; each with over three times the discharge compared to normal conditions. Some estimates claim that over 40 inches of rain fell on the mountains of the region in a five hour period. The James River peaked at 26 feet.</p> <p>Amherst County: More than 100 people died in Amherst and neighboring Nelson Counties.</p> <p>Lynchburg City: Five reported dead due to flooding. Five to six feet of water was noted in the business district. US 29 was blocked due to the floodwaters.</p>
October 10, 1972	<p>Flooding events caused large amounts of damages to primary and secondary roads throughout the region.</p> <p>Amherst County: Amherst with \$142,000 in road damages. There were about 200 locations damaged on secondary roads with eight locations on primary roads suffering substantial damage. Amherst 125,000 in secondary roads, 17,000 in primary roads.</p> <p>Appomattox County: Damage estimates for the county were greater than \$20,000 to secondary roads, \$5,000 to primary roads,</p> <p>Campbell County: Damages to primary roads estimated at \$8,000.</p>



Date	Damages
November 4 - 7, 1985	<p>The remnants of Hurricane Juan combined with successive weather fronts dropped up to 10 inches of rain on the region, causing severe flooding of the James River and its tributaries. Governor Robb appealed to President Reagan for federal aid for 11 localities after the floods caused over \$50 million in damage.</p> <p>Amherst County: Severe flood damage to homes along River Road. Damages were reported at \$5.7 million (\$2 million alone to Treasure Island).</p> <p>Appomattox County: Private property damage totaled \$411,000; Agricultural losses totaled \$33,000 and damage to public property was reported at \$63,000.</p> <p>Bedford County: Damage was estimated at \$4.5 million.</p> <p>Lynchburg: The James River crested at 35 feet: the highest level ever recorded here. City officials estimated damage to private homes, businesses and industries at \$30 million and damage to publicly owned facilities at \$6.3 million. Concord Turnpike and Jefferson and Hydro streets needed road work and debris removal. The Lynchburg foundry was under 24 inches of mud.</p>
November 9, 1985	<p>Flash flooding occurred in normally dry hollows. The James River crested at 35 feet, 17 feet above flood level. The City of Lynchburg suffered severe damages as well as surrounding counties. Damages for counties within the regional commission suffered damages estimated at \$12.5 million.</p> <p>Lynchburg City: A railroad car and several unidentified containers were found floating near the carter glass bridge. Eight people were injured by what was thought to be chlorine fumes. Businesses were overwhelmed with flooding from the James River (by Williams Viaduct). More than 20 buildings were covered to their rooftops and sustained substantial damages. Griffin Pipe Products sustained almost 3 million in damages. Liberty University's football practice facility was flooded with damages to equipment (estimates ranged between \$110,000 - 115,000). Flood damages to the city top \$52 million. Damages to private homes, businesses and industries around \$44.5 million. Damages to publicly owned facilities (sewer and streets) were around \$7.5 million. Flood damage in surrounding counties was estimated at \$12.5 million.</p>
May 19, 1992	The James river crested at 23 feet.



Date	Damages
June 5, 1993	<p>A devastating line of thunderstorms with hurricane-force winds, heavy rains and marble-sized hail tore through Central Virginia, flooding low-lying areas, downing thousands of trees and leaving 50,000 homes without power. Minor structural damage was widespread. No fatalities were reported.</p> <p>Amherst County: \$250,000 in damage was reported, \$60,500 of which was uninsured.</p> <p>Appomattox County: Over \$5 million in damage was reported, over half of which was uninsured.</p> <p>Bedford County: 175 residents of Elks National Home were evacuated when a fallen tree ruptured a propane tank and severe structural damage was reported at Poplar Forest.</p> <p>Campbell County: Over \$5 million in damage was reported, 60% of which was agricultural damage. Telephone and cable services were disrupted, several mobile homes blew over; some secondary roads were entirely impassible.</p> <p>Lynchburg: Over \$20.4 million in damage was reported. Lynchburg Municipal Airport reported sustained wind gusts in excess of 70 m.p.h. and was closed for 10 hours. More than 80 people sought emergency medical care at Lynchburg General Hospital. More than 100 power poles needed replacement resulting in 80% of APCO's service area losing power. Two hangars were severely damaged at Falwell Airport. The back wall of the Old Academy of Music Theater was ripped off, as well as the steeple from First Baptist Church, which blew onto and through the church's roof. More than 14,000 homes were without power 48 hours after the storm, and 300 people were without power 5 days after the storm.</p>
November 27, 1993	<p>Lynchburg City: A section of Forest Brook Road was closed for several hours as a bridge near the Cavalier Steel plant became covered by water due to heavy rains.</p>
August 17, 1994	<p>Bedford: Around 1.25 inches of rain fell as the remnants of Tropical Storm Beryl moved through. One lane of U.S. 460 near Virginia 313 was briefly closed due to high water.</p>
January 15, 1995	<p>The James River crested at 19 feet, one foot above flood stage.</p> <p>Lynchburg City: At Holcomb Rock, between Lynchburg and Big Island the river is expected to crest at 27-28 feet with a flood stage of 22 feet. Nine cows seeking refuge from a flooded pasture in a low section along 460 were struck, causing five accidents.</p>



Date	Damages
June 22, 1995	<p>Over two days of torrential downpours dropped over ten inches of rain in some areas of Central Virginia.</p> <p>Town of Altavista: Lynch Creek overflowed its banks and sent water gushing into three town landmarks – the Lane Col, Shreve Park and the YMCA and deposited one to two feet of mud on town streets.</p> <p>Amherst County: At times, rain fell at the rate of about 2.5 inches per hour. Over 100 Appalachian Power customers were without electricity.</p> <p>Bedford County: U.S. 221 was washed out in several places. The road was also blocked due to a mudslide near Little Otter bridge and was underwater near Aylor's store. Virginia Routes 811, 660 and 621 were also closed due to flooding.</p> <p>Campbell County: Over eight inches of rain fell in less than two days. Timber Lake dam failed, releasing a torrent of water down Buffalo Creek. The 75-acre lake dropped four feet in 30 minutes. A rescue worker was killed as he attempted to reach one of three stranded cars on the U.S. 460 bridge as water rose to almost 5 feet above the road surface on the bridge. The Staunton River north of Altavista crested at nine feet above flood stage. The U.S. 29 bridge over Otter Creek was closed due to floating debris. Virginia Route 683 was closed for three days. Three homes were severely damaged near Buffalo Creek and the Buffalo Creek Nature Area was closed. A local woman was killed as her car was swept away by over eight feet of water on Turkey Foot Road.</p> <p>Lynchburg County: At times, the rain fell at the rate of about 2.5 inches per hour.</p>
June 28, 1995	<p>Heavy rains struck just six days after up to ten inches fell on the region.</p> <p>Amherst County: Heavy rains released a torrent of mud and water down mountainsides and onto U.S. 501, stranding three truck drivers for an entire day. Georgia Pacific's Big Island paper mill was forced to suspend operations due to rising water. Parts of U.S. 60 and Virginia Routes 130, 778 and 685 were closed due to flooding.</p> <p>Bedford County: Parts of Virginia Routes 24, 122 and 221 were closed due to flooding.</p> <p>Lynchburg City: Around \$2 million dollars damage was reported as the James River overflowed its banks.</p>



Date	Damages
July 1-6, 1995	<p>Damaged roads and high water from the worst flooding in decades in Virginia's Piedmont and Shenandoah Valley. Six people had been killed and 2 missing in floodwaters stretching from North to South along the Blue Ridge Mountains. Dozens of homes were destroyed and others will have to be razed because they are no longer safe. Flood damages were substantial for local farmers.</p> <p>Amherst County: Due to flooding, one road in the County was closed.</p> <p>Bedford County: 400 acres of milling wheat worth 4.25 a bushel was degraded to a lower grade that sells as 3 a bushel.</p> <p>Bedford City: A four foot wide sinkhole formed along South Street, police closed two blocks until damages could be repaired.</p> <p>Campbell County: Due to flooding, three roads in the County had to be blocked off. Much of the County's crop damage occurred along the Otter River and nearby Buffalo, Flat and Troublesome Creeks. They suffered \$720,000 in damage to hay and corn crops.</p>
January 19, 1996	<p>Heavy rains, melting snow, and high winds Friday morning shut down schools, closed roads, and flooded low-lying areas. Problems continued when the James River crested downstream from Lynchburg through Amherst and Nelson Counties.</p> <p>Bedford County: Portions of US 460 near Montvale were closed from flooding. Small trees were felled with no injuries were reported. The James River crested upstream from Lynchburg near Big Island, flooding portions of Georgia-Pacific paper mill.</p> <p>Lynchburg City: City officials evacuated residential roads near the James River. Residents on Hydro Street and Ruesens Road were also evacuated. Houses along Timberlake Drive suffered minor flood damages.</p> <p>Town of Altavista: Lynch Creek flooded portions of Pittsylvania Avenue, Main Street, and 7th Street. The Altavista Life Saving building as well as Shreve Park and War Memorial Park suffered water damage. Schools were closed due to dangers of flash flooding.</p>



Date	Damages
September 6, 1996	<p>Hurricane Fran caused flash flooding that closed portions of most area highways and downed trees, leaving thousands without electricity.</p> <p>Amherst County: 20 roads were closed due to flooding.</p> <p>Town of Amherst: 300 residents were without power.</p> <p>Lynchburg City: 200 residents were without power. Hardest hit areas of flooding included Old Forest Road near Lynchburg College and the Greenwood and Sandusky apartments near the intersection of Greenwood and Oakdale Drives.</p> <p>Bedford County: 200 residents were without power.</p> <p>Campbell County: The historic Marysville Covered Bridge was destroyed. Trees were uprooted. 40 roads, including US 460 near Bedford County line and VA 24 west of US 29 were closed because of excess water.</p>
January 28, 1998	<p>Heavy rainfall in the region resulted in some moderate damage. Rainfall totals for region ranged from 1 to 3 inches.</p> <p>Appomattox County: Heavy rains resulted in Wreck Island Creek flooding Route 666 about 4 miles west-northwest of Oakville. The bridge and adjacent road was damaged by the flooding.</p>
August 8, 1998	<p>Thunderstorms on the 8th produced very heavy rain resulting in flash flooding. Thunderstorm rains flooded Route 29, five miles south of Lynchburg,</p> <p>Lynchburg City: About 2-3 inches falls in an hour in Lynchburg. Minor flooding and roads blocks for a few hours in Lynchburg area. Street included Fort Avenue, Sandusky Drive, McConville Rd., US 460. Flooding subsided in several hours.</p>
September 5, 1999	<p>Heavy rain from Tropical Storm Dennis downgraded to a tropical depression, brought over 3 inches of rain over two days at the Lynchburg airport. Some small creeks and streams flooded.</p> <p>Bedford County: Street flooding at the intersection of Route 24 and Route 122, eight and a half miles south of the City of Bedford and flooded Goose Creek onto adjacent roads, 10.5 miles south of the City of Bedford. High winds downed a tree onto State Route 863.</p> <p>Lynchburg City: The area received over three inches of rain in two days.</p>



Date	Damages
September 29, 1999	<p>Thunderstorms on the 29th produced damaging winds, flash flooding, and two tornadoes.</p> <p>Amherst County: Flooding caused the closing of Route 460 one mile north of Concord, stranding a motorist, numerous small streams and roads in Amherst County. Schools closed in Amherst County where over a dozen roads were closed due to flooding.</p> <p>Appomattox County: Flooded Mill Stream Bridge in Gretna, and several streams in western Appomattox County, closing several roads.</p> <p>Campbell County: Six creeks in western Campbell County flooded, closing several roads.</p> <p>Lynchburg City: Several roads were closed due to flooding. Thunderstorms spawned tornados in the area. One tornado was 50 yards wide and maximum winds were also estimated at about 80 miles an hour. In Lynchburg, 4.5 inches of rain over 48 hours. Problem areas were Hollins Mills Rd over Blackwater Creek, Greenwood Dr. at Greenwood Manor Apartments in Sandusky area, and 12th street between Harrison and Polk Street had a mudslide.</p>
April 16, 2000	<p>This storm resulted in four inches of rain in 2 hours.</p> <p>Bedford County: Four inches of rain fell in 2 hours. Communication center lost power; the water treatment plant had some flooding, damage several pump stations and electrical equipment.</p>
June 5, 2001	<p>Thunderstorms during the afternoon and evening of the 5th produced hail up to nickel size, flash flooding, and damaging winds.</p> <p>Bedford City: Thunderstorm winds downed trees in Bedford. A tent was also blown over in Bedford, resulting in minor injuries to a photographer.</p> <p>Campbell County: Several creeks flooded in northern Campbell County causing street closures in Timberlake.</p> <p>Lynchburg City: Heavy thunderstorm rains caused Dreaming Creek to flood Route 460 in Lynchburg.</p>
February 22, 2003	<p>Minor to moderate flooding occurred on the James River from the 22nd through the 24th. The river crested on the 22nd at 19.86 feet at Lick Run. Heavy rain brought flooding, combined with rain and wind could result in fallen trees and power outages.</p> <p>Amherst County: Flooding was noted near Beck Creek.</p> <p>Campbell County: Several roads in Altavista were closed, including 7th street and west, country club and pocket roads.</p> <p>Lynchburg City: Two streets were closed due to flooding (Greenwood Road). Several basements at Greenwood Apartments were flooded.</p>



Hazard Profile

A flood occurs when an area that is normally dry becomes inundated with water. Floods may result from the overflow of surface waters, overflow of inland and tidal waters, dam breaks or mudflows. Flooding can occur at any time of the year, with peak hazards in the late winter and early spring. Snowmelt and ice jam breakaway contribute to winter flooding; seasonal rain patterns and torrential rains from hurricanes and tropical systems contribute to flooding. Development of flood-prone areas tends to increase the frequency and degree of flooding.

Floods are typically characterized by frequency. For example, the “1%-annual chance flood” is commonly referred to as the “100-year” flood. The 1%-percent annual chance flood is used for most regulatory and hazard identification purposes. While more frequent floods do occur, as well as larger events that has lower probabilities of occurrence. Floods pick up chemicals, sewage, and toxins from roads, factories and farms. Therefore any property affected by the flood may be contaminated with hazardous materials. Debris from vegetation and man-made structures may also be hazardous following the occurrence of a flood. In addition, floods may threaten water supplies and water quality, as well as initiate power outages.

Secondary Effects

Flooding can pose some significant secondary impacts to the area where the event has taken place. Some of the impacts to consider include infrastructure and utility failure, impacts to roadways, water service and wastewater treatment. These impacts can affect the entire planning district, making the area vulnerable to limited emergency services.

Flood Maps

More detailed data was available as “Q3 flood maps” for a majority of the counties in the region. The Q3 flood maps are digital versions of the FEMA paper FIRMs that have been georectified and digitized. When a digital version of the floodplains was not available, digital paper copies of the FEMA Flood Insurance Rate Maps (FIRMs) were utilized. To be able to conduct analysis, the digital paper FIRMs were georectified and digitized. Bedford City was able to provide detailed data for Big Otter and Ivy Creek reaches.

These maps were used to determine the risk and vulnerability of flooding to the planning district. Figure V-11 shows the extent of the FEMA mapped floodplain in the region. Digital Q3 FEMA FIRMS maps were available for:

- Bedford County
- Bedford City
- Campbell County
 - Altavista, Town of
 - Brookneal, Town of
- Lynchburg City



For the communities with paper versions of the FEMA FIRMS, CGIT used available resources to digitally convert the paper maps. This process was deemed necessary for conducting analysis and loss estimation for the communities. Paper FEMA FIRMS maps were available for:

- Amherst County
 - Amherst, Town of
- Appomattox County
 - Appomattox, Town of
 - Pamplin City, Town of (Not Available)

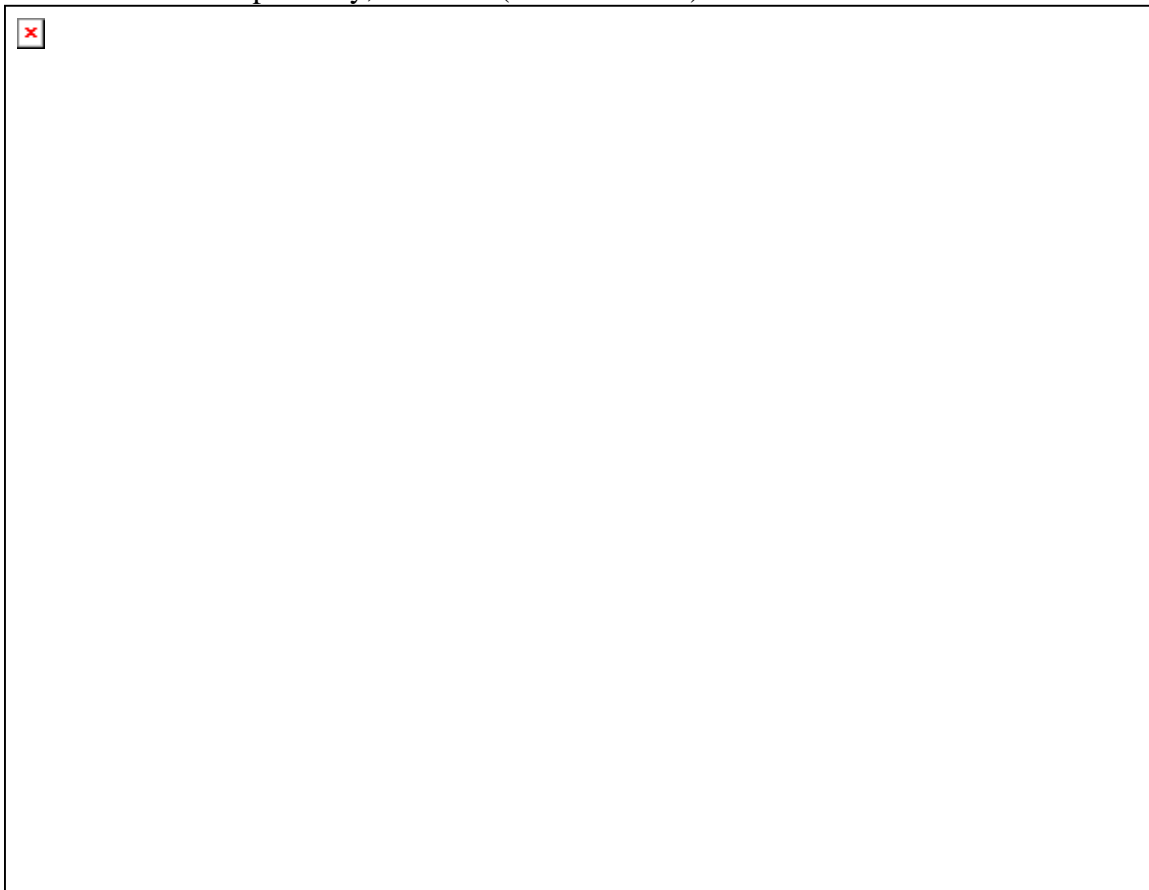


Figure V-11. Region 2000 RC FEMA designated Floodplains.



Vulnerability Analysis

The steering committee and data focus groups helped to document specific areas that are susceptible to flooding based on their local knowledge. These areas were taken into account when completing the hazard identification and risk assessment. Flooding problem spot maps and tables can be found in Appendix V-1.

Many factors contribute to the relative vulnerabilities of areas within the floodplain. Some of these factors include development or the presence of people and property in the floodplain, flood depth, velocity, elevation, construction type, and flood duration.

FEMA-Designated Repetitive Loss Properties

FEMA provides a Repetitive Loss List of the properties in a community that have received two or more flood insurance claims, greater than \$1,000, from the National Flood Insurance Program (NFIP) within a 10 year timeframe. The Repetitive Loss list includes pertinent information regarding the property address, dates of claims, amounts received and owner information. Some of this information has been withheld from Table V-10; see your local NFIP coordinator for specific information.

There are 25 repetitive loss properties in the commission, with an average payment of \$32,461 per structure (Table V-10). A majority of the repetitive loss structures for the region are non-residential properties. Note that FEMA designates counties, cities and towns separately in the table. This table provides a listing of the houses that have repetitive loss; this list does not include all of the houses that have had damage due to flooding.

Table V-10. Region 2000 RC Repetitive Loss Structures (from FEMA).

Region 2000 RC Repetitive Loss Structures (as of 12/31/2003)									
Community Name	Insured ?	Occupancy	Flood Zone	Building Value	Total Building Payment	Total Contents Payment	Losses	Total Paid	Average Paid
AMHERST COUNTY	NO	SINGLE FMLY	B	\$95,046.00	\$65,776.53	\$8,946.50	3	\$74,723.03	\$24,907.68
AMHERST, TOWN OF	NO	NON RESIDENT	A06	\$258,900.00	\$98,997.57	\$23,014.29	22	\$122,011.86	\$5,545.99
APPOMATTOX COUNTY	NO	SINGLE FMLY	A	\$75,000.00	\$100,000.00	\$17,433.31	2	\$117,433.31	\$58,716.66
APPOMATTOX COUNTY	YES	SINGLE FMLY	A	\$37,700.00	\$102,990.77	\$25,000	4	\$127,990.77	\$31,997.69
BEDFORD COUNTY	NO	SINGLE FMLY	C	\$9,563.00	\$4,236.68	\$273.20	2	\$4,509.88	\$2,254.94
BEDFORD COUNTY	NO	NON RESIDENT	A13	\$104,008.00	\$36,970.32	\$12,681.50	4	\$49,651.82	\$12,412.96
BEDFORD COUNTY	NO	SINGLE FMLY	A	\$65,000.00	\$62,647.57	\$5,464.70	2	\$68,112.27	\$34,056.14
LYNCHBURG, CITY OF	YES	NON RESIDENT	A18	\$258,368.00	\$2,917.93	\$7,175.75	2	\$10,093.68	\$5,046.84
LYNCHBURG,	NO	NON	A18	\$116,941.00	\$5,145.98	\$23,177.29	3	\$28,323.27	\$9,441.09



Region 2000 Regional Commission
Multi-Jurisdictional Hazard Mitigation Plan
HIRA Section

Region 2000 RC Repetitive Loss Structures (as of 12/31/2003)

Community Name	Insured ?	Occupancy	Flood Zone	Building Value	Total Building Payment	Total Contents Payment	Losses	Total Paid	Average Paid
CITY OF		RESIDENT							
LYNCHBURG, CITY OF	YES	NON RESIDENT	A18	\$116,480.00	\$7,573.37	N/A	2	\$7,573.37	\$3,786.69
LYNCHBURG, CITY OF	NO	SINGLE FMLY	AE	\$194,200.00	\$63,138.26	\$30,881.85	3	\$94,020.11	\$31,340.04
LYNCHBURG, CITY OF	YES	NON RESIDENT	A18	\$112,000.00	\$39,317.67	\$92,870.82	3	\$132,188.49	\$44,062.83
LYNCHBURG, CITY OF	YES	OTHER RESID	A	\$144,000.00	\$32,251.86	N/A	2	\$32,251.86	\$16,125.93
LYNCHBURG, CITY OF	YES	OTHER RESID	A	\$144,000.00	\$31,484.76	N/A	2	\$31,484.76	\$15,742.38
LYNCHBURG, CITY OF	YES	OTHER RESID	A	\$144,000.00	\$31,484.76	N/A	2	\$31,484.76	\$15,742.38
LYNCHBURG, CITY OF	YES	OTHER RESID	A	\$144,000.00	\$31,484.76	N/A	2	\$31,484.76	\$15,742.38
LYNCHBURG, CITY OF	YES	OTHER RESID	A	\$28,282,800.00	\$142,918.64	N/A	6	\$142,918.64	\$23,819.77
LYNCHBURG, CITY OF	YES	NON RESIDENT	A	\$45,000.00	\$4,280.01	N/A	2	\$4,280.01	\$2,140.01
LYNCHBURG, CITY OF	NO	NON RESIDENT	A18	\$665,828.00	\$7,429.53	\$10,692	2	\$18,122.49	\$9,061.25
LYNCHBURG, CITY OF	NO	NON RESIDENT	C	\$115,000.00	\$1,766.75	\$8,138	2	\$9,904.76	\$4,952.38
LYNCHBURG, CITY OF	NO	NON RESIDENT	A18	\$1,605,768	\$230,531.66	\$336,235.15	3	\$566,766.81	\$188,922.27
LYNCHBURG, CITY OF	NO	ASSMD CONDO	C	CONDO	\$0.00	\$49,022.01	2	\$49,022.01	\$24,511.01
LYNCHBURG, CITY OF	NO	NON RESIDENT	A18	\$677,600	\$542.38	\$277,119.13	5	\$277,661.51	\$55,532.30
LYNCHBURG, CITY OF	NO	NON RESIDENT	A18	\$601,116	\$76,882.19	\$168,348.36	2	\$245,230.55	\$122,615.28
LYNCHBURG, CITY OF	NO	NON RESIDENT	A18	\$599,040	\$167,501.94	\$97,815.85	5	\$265,317.79	\$53,063.56
TOTAL				\$34,611,358	\$1,348,271.89	\$1,194,290.68	89	\$2,542,562.57	\$32,461.62



Structures at Risk-Vulnerability

In general, when tax parcel level information on property value existed, then they were used in the flood loss analysis. When they were not available, average structural value per census block from HAZUS-MH was used (Table V-11).

Table V-11. Region 2000 RC Structural and Property Data Availability

Community	Structural and Property Data
Amherst County	GIS tax parcels without values; Average building value per census block from HAZUS-MH.
Amherst, Town of	GIS tax parcels without values; Average building value per census block from HAZUS-MH.
Appomattox County	Average building value per census block from FEMA HAZUS-MH
Appomattox, Town of	GIS tax parcels without values; Average building value per census block from HAZUS-MH.
Pamplin City, Town of	GIS tax parcels without values; Average building value per census block from HAZUS-MH.
Bedford City	GIS building footprints without values; Average building value derived from HAZUS-MH census blocks
Bedford County	GIS tax parcels with values
Campbell County	GIS tax parcels with values and building footprints
Altavista, Town of	GIS tax parcels with values and building footprints
Brookneal, Town of	GIS tax parcels with values and building footprints
Lynchburg City	GIS building footprints without values; Average building value derived from HAZUS-MH census block



The flood vulnerability was determined for each locality based on the intersection of floodplain mapping and structure value mapping. This varied by community based on the data availability. In communities like Bedford City, Campbell County and Lynchburg City where building footprints for structures were known, the intersection analysis showed which structures were entirely or partially within the floodplain. If a community only had parcel mapping, the mapping intersection determined which parcels were partially or entirely in the floodplain. When only census block mapping was available, the mapping intersection showed which census blocks were partially or entirely within the floodplain. Based on the mapping intersection and the number of households and housing units in the census block, an estimate was determined of the total structures flooded in each the census block.

Table V-12 lists the total replacement value of structures vulnerable to flooding (both partially and entirely within the floodplain) in each community. These replacement values for structures were calculated as 10% greater than the assessed improvement values from community parcel data or from the HAZUS-MH census block average values. For communities without parcel level property values, these values are underestimates, especially for any non-residential structures in the floodplain.

Table V-12. Structure Value Vulnerability *denotes town values that are also included in totals for the perspective County.

Community	Total Structure Value Vulnerability
Amherst County	\$37,592,830
* <i>Amherst, Town of</i>	\$2,788,170
Appomattox County	\$14,547,720
* <i>Appomattox, Town of</i>	\$745,800
* <i>Pamplin City, Town of</i>	\$0
Bedford City	\$3,551,350
Bedford County	\$206,103,700
Campbell County	\$57,723,356
* <i>Altavista, Town of</i>	\$2,384,820
* <i>Brookneal, Town of</i>	\$241,340
Lynchburg City	\$20,764,480
Total	\$346,443,566



Estimating Losses

Using the property values from Table V-1 and V-12, an estimate of the potential flood loss for each community was developed. Losses included structure and contents damage using a method based on FEMA Benefit Cost Analysis. Contents values were estimated as 30% of the structural replacement value. Structural damage percentages were based on the portion of the footprint, parcel, or census block that was in the floodplain. Table V-13 shows the basis for these damage percentages and how they were assigned depending on the mapping detail.

Contents damages were estimated as 50% greater than the structural damage percentage. These values were used to predict the damage from a 100-yr flood event for the structure. To calculate an annualized flood damage estimate, it was assumed for each structure damages began with a 25-yr event. A percentage of the 100-yr flood damage value was used for events less frequent than the 100-yr event.

For example, a parcel with 45% in the floodplain is estimated to have a structure worth \$100,000 based on the community parcel database. The replacement value of the structure would be \$110,000 and the contents value \$33,000. Based on 45% of the parcel in the floodplain, the structure would be in flood damage class 2, with 20% 100-yr structure damage and the 30% contents damage. The final 100-yr flood damage equals \$22,000 structural plus \$9,900 contents or \$31,900 from a 100-yr flood event. Figure V-12 shows the probability assumptions are used to estimate the annualized loss at \$797.50.

Table V-13. Flood Damage Classes

Flood Damage Class	100-yr % Structural Damage	Representative Flood Depth Range	Mapped Footprints in Floodplain	Mapped Parcels in Floodplain	Mapped Census Blocks in Floodplain
1	11%	0 to +1 ft		< 33%	< 33%
2	20%	+1 to + 3 ft	Partial	33% - 66%	33% - 66%
3	28%	> 3 ft	Entire	> 66 %	> 66 %

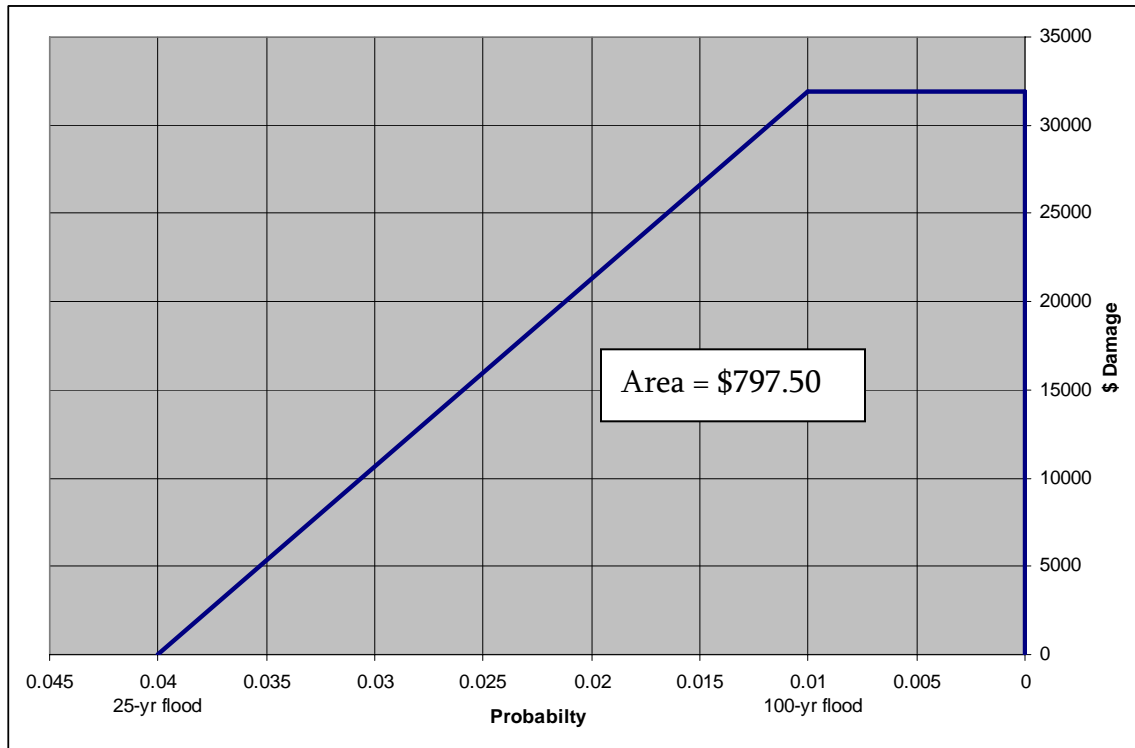


Figure V-12. Example of Flood Loss Estimate Technique.

Table V-14 provides the total flood loss estimates for each flood class and county. Figure V-13 shows the census blocks where these losses occur. While most of the flood prone census blocks have less than \$20,000 annual flood losses, there are a select locations in Bedford County with over \$40,000 in one census block. Table V-14 shows the annualized loss estimate for damage to structures and contents, broken down by community. From the table, Bedford County makes up 63% of the total estimated damage amounts followed by Amherst County with 15% of the total estimated damage amount. Figure V-13 illustrates the distribution of annualized flood damage for the Regional Commission. A large majority of the flood damage is within the less than \$20,000 annually, categorized by census blocks.



Table V-14. Annualized Structure and Contents Loss Estimates *denotes town values that are also included in totals for the perspective County.

Community	Total Loss Estimate
Amherst County	\$133,471
* Amherst, Town of	\$10,477
Appomattox County	\$51,340
* Appomattox, Town of	\$2,389
* Pamplin City, Town of	\$0
Bedford City	\$31,410
Bedford County	\$1,557,077
Campbell County	\$162,655
* Altavista, Town of	\$85,893
* Brookneal, Town of	\$773
Lynchburg City	\$159,046
Total	\$2,194,531

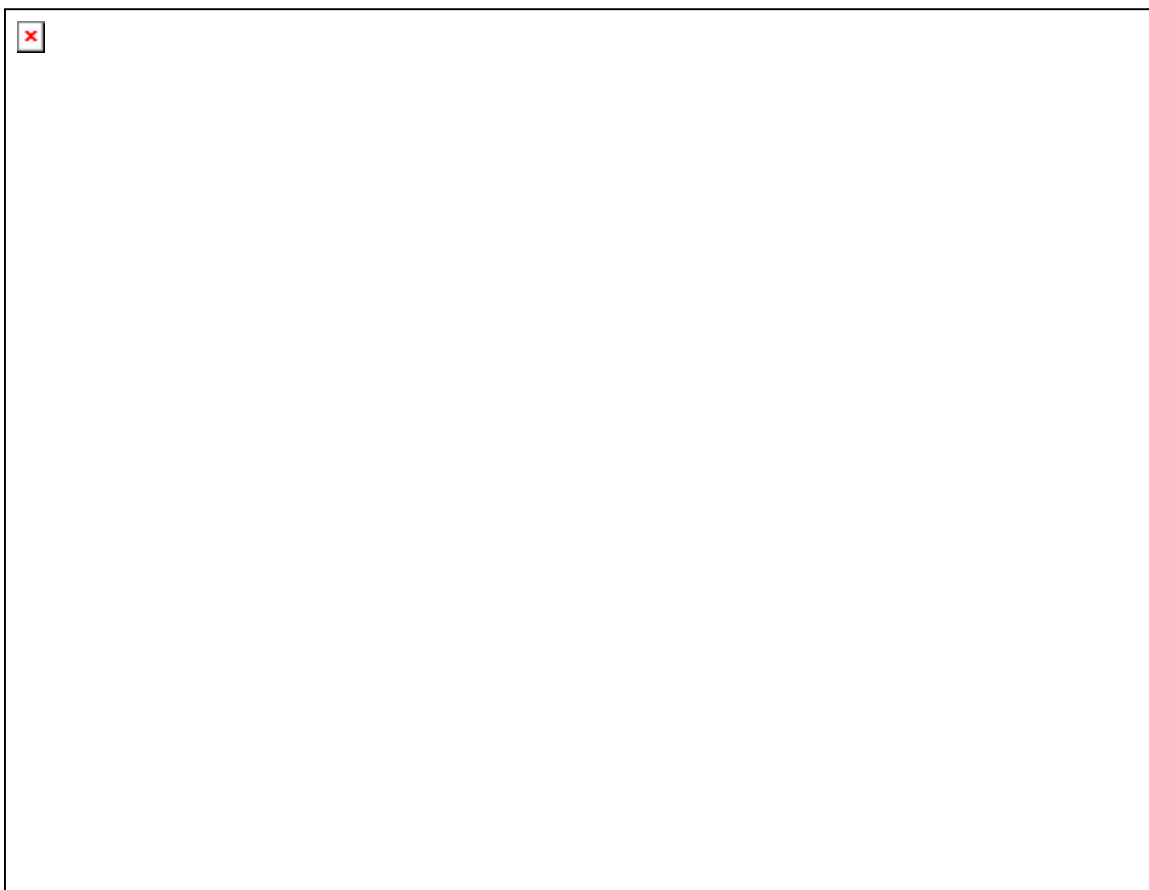


Figure V-13. Region 2000 RC Flood Losses by Census Blocks.



Appendix V-2 contains the zoom-in maps for the annualized flood damages for each of the localities in the region. The Appendix contains a full size map for the region, followed by the subsequent locality maps. These maps were consulted during the mitigation action development for potential sites of future actions.

Jurisdictional specific annualized flood damage maps have been created for the region (Appendix V-2). It should be noted that no FEMA floodplain maps exist for the towns of Pamplin City. Each region is unique in their exposure to flooding. The following is a summation of the major trends illustrated on the jurisdictional specific maps:

- Amherst County receives most of its annualized flood damage in the southeastern portion of the county along the James River. The flood damages in the county, by Census block are less than \$20,000 annually.
- The Buffalo River, Rutledge Creek, Williams Creek and Higginbotham Creek account for the annual flood damages in the Town of Amherst.
- Appomattox County has a sprinkling of annual flood damages throughout the county. The James River borders the northwest of the county, and Cedar Creek borders the southeastern portion of the county.
- The Town of Appomattox has very limited annual flood damages. Purdums Branch and the South Fork of the Appomattox River run through the southern tip of the town.
- No FEMA flood plain maps exist of the Town of Pamplin City.
- Bedford County receives a high amount of flood damages as a result of Smith Mountain Lake in the southern tip of the County. Annual damage estimates range from \$20,000 to \$40,000 per Census block.
- Bedford City receives most of its flood damages from an Unnamed Tributary to Little Otter River. A majority of flood damages occurs outside of the city limits.
- Campbell County, like Appomattox County, has very limited annualized flood damages. A majority of the present damage occurs along the Roanoke River to the south and along Beaver Creek to the north.
- The majority of the Town of Altavista is within a flood damage area. The Roanoke River to the south accounts for high damages to Census block, with greater than \$20,000 annual damage.



- The northern portion of the Town of Brookneal receives all of the annualized flood damages for the town. Falling River and the Brookneal Reservoir account for this damage.
- The City of Lynchburg receives most of its flood damage from main stream branches. These bodies of water being the James River, Blackwater Creek and Ivy Creek.

Problem Spot Mapping

See Appendix V-1 for Figures and Tables summarizing the problem spot locations that were denoted by the steering committee. These are areas of concern that were designated by the steering committee and public. When specific town information was provided it was included on the problem spot maps. If no information was provided by the localities, or they acknowledged there was no need for a specific map, the map was omitted from the Appendix.



Critical Facilities

The impacts of flooding on critical facilities can significantly increase the overall effect of a flood event on a community. It should be noted that these facilities have been determined to be in the floodplain using Geographic Information Systems (GIS) and should be used only as a planning tool. In order to accurately determine if a structure is actually in the floodplain, site-specific information must be available. Twenty critical facilities were denoted as being located within the FEMA designated floodplain (Table V-15). Mitigation actions address these concerns for critical facilities.

Table V-15. Critical Facilities in the Floodplain.

Community	Critical Facility Name
Amherst County	Dodds Store
Amherst County	Early Dam
Amherst County	Elon Water Works Dam
Amherst County	Graham Creek Res. Dam #1
Amherst County	Kick's Store
Amherst County	Holcomb Rock Dam
Amherst County	Midway Church
Amherst County	Pedlar Fire and Rescue
Amherst County	St. Paul's Mission School
Amherst County	St. Paul's Episcopal Mission
Appomattox County	East Fork Falling River #15 Dam
Appomattox County	East Fork Falling River #21 Dam
Bedford County	Bore Auger Church
Bedford County	Coleman's Fall Dam
Bedford County	Pent Holiness Church
Bedford County	Sharon Church
Bedford County	Sharon School (historical)
Bedford County	Steven's Chapel
Campbell County	Hazmat location
Campbell County	Altavista Area YMCA Discovery Place

Dams

Dam failure poses minimal risk as a hazard, but is a large potential threat to areas with large populations surrounding dams. One of the major events for the Region 2000 Regional Commission took place on June 22 and 23, 1995 when the Timberlake dam failed. See Appendix V-3 for a more detailed summary of this failure.

Many different scenarios can result in dam failure. Overtopping is one of the most common causes of dam failure, and it occurs when the dam's spillway is inadequate for dealing with excess water. During flood events, too much water to be properly handled by the spillway may rush to the dam site, and flow over the top of the dam. Improper



building construction, including using easily eroded construction materials, also frequently leads to the slow structural failure of dams. This failure can be compounded by underlying geological factors such as porous bedrock that loses structural integrity when saturated. Landslides pose two threats to dams, both upstream from the dam and at the dam site itself. At the dam site, a landslide could completely wipe out the dam from its foundation. A landslide upstream has the potential to send a wave of water surging towards the dam, quite possibly causing an overtopping event. Earthquakes are also a major threat to dams, though it is very rare that a dam will be completely destroyed by an earthquake. In the event of total failure, the most common cause is the liquefaction of fill along the dam wall. Terrorist attacks are also another concern for dam safety.

No matter what the cause of dam failure, the aftermath of such an event can range from moderate to severe. It is likely that the failure of major dams will cause widespread loss of life downstream to humans and animals, as well as extreme environmental stress along the flood path. Water supplies upstream could be left completely dry, while water supplies downstream are overrun or contaminated with debris from the ensuing flood.

The National Inventory of Dams provides information about individual dams. Figure V-14 illustrates the locations and hazard potential of dams in the region. A large percentage of the dams in the Regional Commission have been rated as low or significant potential for failure. The dam inventory also provides information on the downstream hazard potential of a dam failure. The dam inventory divides the hazard potential into three categories: low, high and significant. The classification is based on two main criteria 1) Loss of Human Life and 2) Economic, Environmental, Lifeline Losses. Dams that were assigned a low potential indicate that there is a low potential for failure or miss-operation resulting in no probable human loss or economic and environmental losses. Significant potential for dam failure is often in predominantly rural or agricultural areas but could affect areas with populations and infrastructure. High potential areas are categorized by dam failure that would probably result in the loss of human life. It is important to note that the areas potentially affected if these dams were to fail are not restricted to these counties.



Figure V-14. Region 2000 RC Dam Locations and Failure Potential (from NID)

Table V-16 denotes the classification that VA DCR uses to regulate dams in the Commonwealth. On-going dam inspections and Virginia's participation in the National Dam Safety Program maintained by FEMA and the U.S. Army Corps of Engineers serve as preventative measures against dam failures.

Table V-16. Regulated Dam Classes

Class	Description	Inspection Period
Class I	Dams which upon failure would cause probable loss of life or excessive economic loss	Inspected every two years.
Class II	Dams which upon failure could cause possible loss of life or appreciable economic loss	Inspected every three years.
Class III	Dams which upon failure would not likely lead to loss of life or significant economic loss	Inspected every six years, upon renewal of the certificate.
Class IV	Dams which upon failure would not likely lead to loss of life or economic loss to others	Inspection not applicable for Class IV.



Drought (High Ranking)

Hazard History

Table V-17 includes descriptions of major droughts that have occurred in the Region 2000 RC. Events have been broken down by the date of occurrence and when available, by individual community descriptions. When no community specific description is available, the general description should be used as representing the entire planning area.

Table V-17. Drought Hazard History

Date	Damages
1976-1977	Ten months of below average precipitation. The drought began in November of 1976 when rainfall totaled to only 50 to 75% of normal.
1985-1986	Very little rainfall began in December and the trend continued through out the summer. Total precipitation January and February was 2 inches.
2001-2002	Stream levels were below normal with record lows observed at gages for the York, James, and Roanoke River Basins. By November of 2002 the US Secretary of Agriculture had approved 45 counties for primary disaster designation, while 36 requests remained pending.

Hazard Profile

A drought can be characterized in several different ways depending on the impact. The most common form of drought is agricultural. Agricultural droughts are characterized by unusually dry conditions during the growing season. Meteorological drought is an extended period of time (6 or more months) with precipitation less than 75 percent of the normal precipitation. Severity of droughts often depends on the community reliance on a specific water source.

Many problems can arise at the onset of a drought, some of which include diminished water supplies and quality, livestock and wildlife becoming undernourished, crop damage, and possible wildfires. Secondary impacts from droughts pose problems to farmers with reductions in income, while food prices and lumber prices could drastically increase.

The impact of excessive heat is most prevalent in urban areas, where urban heat island effects prevent inner-city building from releasing heat built up during the daylight hours. Secondary impacts of excessive heat are severe strain on the electrical power system and potential brownouts or blackouts.

Table V-18 provides a summary of drought categories and impacts. Notice that water restrictions start off as voluntary and then become required. For excessive heat, the National Weather Service utilizes heat index thresholds as criteria for the issuance of heat advisories and excessive heat warnings.



Table V-18. Drought Severity Classification

Drought Severity		
Category	Description	Possible Impacts
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.
D1	Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing or imminent, voluntary water use restrictions requested
D2	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions

Drought response plans have been prepared for the region, which contain pertinent information on how the region responds on the eve and during drought conditions. During long periods of drought, each locality imposes restrictions on water use. Some mitigation actions detail voluntary restrictions, community education, and developing and maintaining secondary water supplies on a regional basis.

Vulnerability Analysis

The 1990 U.S. Census data contained detailed information about source of water per census block group. For purposes of this analysis, it was assumed that areas with populations having less than 25% of public/private water systems had a high vulnerability ranking. When a drought occurs, these areas would likely have a larger impact since most homes receive their water from wells, which may dry up during a drought. Low vulnerability was assigned to regions with more than 50% of their population drawing from public or private water systems. Table V-19 provides a summary of the 1990 population in three categories of drought vulnerability. Note that the table contains information specific to the towns; this information has also been included with the county totals. As a result of using 1990 U.S. Census data, at the tract level, there are some discrepancies with the town boundaries. Boundary adjustments into “high vulnerability” areas are a result of the older census data, which is a data limitation issue. Future updates of this plan will use, if available, the most current census data for water systems. Figure V-15 shows each of the designated categories for each of the jurisdictions. Most cities and towns are supplied by a public or private water system. Mitigation actions for the region reflect the regions concern for drought and water supply.



Table V-19. Region 2000 RC Population Drought Risk (from 1990 Census). *denotes town values that are also included in totals for the perspective County.

Percent Population with Public or Private Water Systems				
Community	HIGH (< 25%)	MEDIUM (25% - 50%)	LOW (> 50 %)	TOTAL
Amherst County	6,146	4,259	18,173	28,578
*Amherst, Town of	0	1,060	0	1,060
Appomattox County	9,334	2,024	940	12,298
*Appomattox, Town of	*0	1,707	0	1,707
*Pamplin City, Town of	208	0	0	208
Bedford City	0	0	6,073	6,073
Bedford County	27,365	10,116	8,175	45,656
Campbell County	21,819	6,337	19,416	47,572
*Altavista, Town of	0	0	3,686	3,686
*Brookneal, Town of	*0	0	1,344	1,344
Lynchburg City	0	0	66,049	66,049
Total	64,664	22,736	118,826	206,226

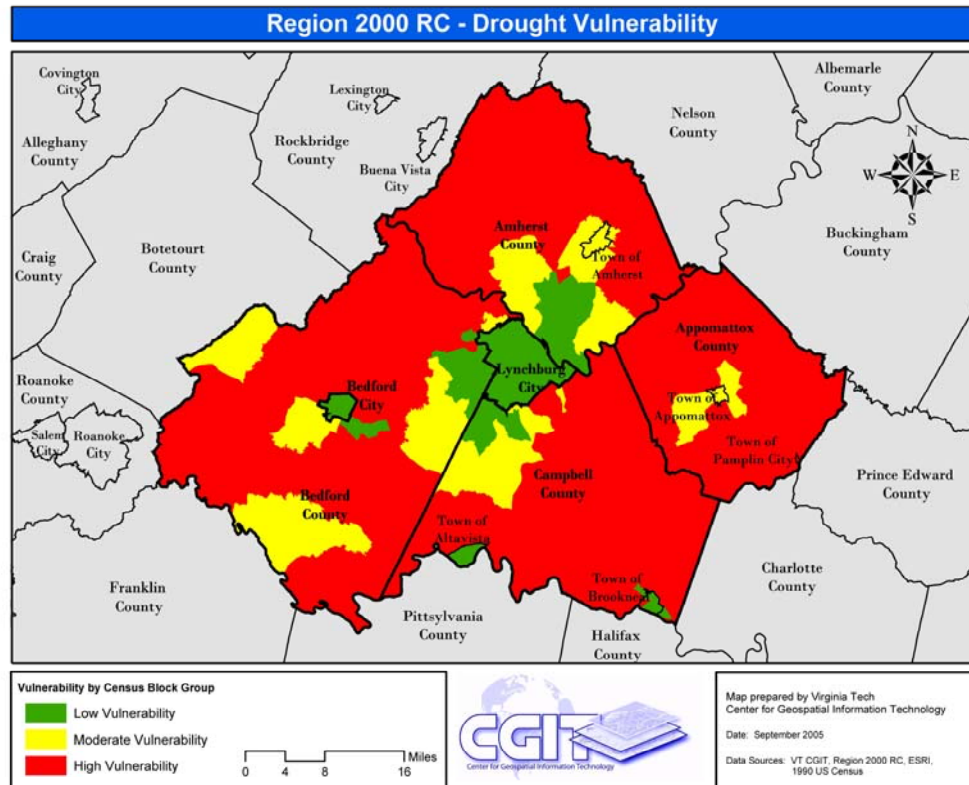


Figure V- 15. Region 2000 RC Drought Vulnerability.



Hurricane Wind (Medium Ranking)

Hazard History

Table V-20 includes descriptions of major hurricane events in the Region 2000 RC. Events have been broken down by the date of occurrence and when available, by individual community descriptions. When no community specific description is available, the general description should be used as representing the entire planning area.

Table V- 20. Hurricane Hazard History

Date	Damages
August 17-18, 1955	The category one hurricane named Diane caused heavy rains, compounding the flooding caused by Connie not even a week earlier. The lowest pressure seen across Virginia was 29.48" at Lynchburg. Several locations on the eastern slope of the Blue Ridge mountains recorded over a foot of rain. However, the heaviest flooding occurred along portions of the Shenandoah River Basin. High tides were also experienced, in addition to the rains. Damage in Virginia totaled \$10.7 million. This hurricane produced over \$686 million in damage, mainly due to its disastrous floods across the East Coast
August 23, 1969	Torrential rains resulting from the stalling of Hurricane Camille by a cold front caused record floods on the Piney, Pedlar and Buffalo Rivers; each with over three times the discharge compared to normal conditions. Some estimates claim that over 40 inches of rain fell on the mountains of the region in a five hour period. Amherst County: More than 100 people died in Amherst and neighboring Nelson Counties.
June 23, 1972	Hurricane Agnes. James river seen topping flood stage as rains continue. torrential rains in Lynchburg closed many of the city's though fares and industrial plants. At least on apartment complex was evacuated. Greenwood apartments on greenwood drive were evacuated as the creek flowing into College Lake overflowed. Many roads closed as a result of flooding. Caused minor backyard flooding along even the smallest rivers, agricultural and structural damage along major rivers.
November 4 - 7, 1985	The remnants of Hurricane Juan combined with successive weather fronts dropped up to 10 inches of rain on the region, causing severe flooding of the James River and its tributaries. Governor Robb appealed to President Reagan for federal aid for 11 localities after the floods caused over \$50 million in damage. Amherst County: Severe flood damage to homes along River Road. Damages were reported at \$5.7 million (\$2 million alone to Treasure Island). Appomattox County: Private property damage totaled \$411,000; Agricultural losses totaled \$33,000 and damage to public property was reported at \$63,000. Bedford County: Damage was estimated at \$4.5 million. Lynchburg City: The James River crested at 35 feet: the highest level ever recorded here. City officials estimated damage to private homes, businesses and industries at \$30 million and damage to publicly owned facilities at \$6.3 million. Concord Turnpike and Jefferson and Hydro streets needed road work and debris removal. The Lynchburg foundry was under 24 inches of mud.



Date	Damages
August 17, 1994	<p>Bedford: Around 1.25 inches of rain fell as the remnants of Tropical Storm Beryl moved through. One lane of U.S. 460 near Virginia 313 was briefly closed due to high water.</p> <p>Lynchburg City: Greater than 70 mph winds knocked down trees and power lines. Two million in damages.</p>
September 6, 1996	<p>Hurricane Fran caused flash flooding that closed portions of most area highways and downed trees, leaving thousands without electricity.</p> <p>Lynchburg City Twenty roads were closed due to flooding. Tens of thousands of American electric power company customers were without power. The storm closed businesses, schools and forced evacuations. The floodwaters formed a lake between Greenwood Dr and Sandusky Drive. Hardest hit areas of flooding included Old Forest Road near Lynchburg College and the Greenwood and Sandusky apartments near the intersection of Greenwood and Oakdale Drives.</p> <p>Town of Amherst: Three hundred residents were without power.</p> <p>Bedford County: Two hundred residents were without power. 40 roads, including US 460 near Bedford County line and VA 24 west of US 29 were closed because of excess water.</p> <p>Campbell County: Residents of the apartment complex were rescued with boats. Brookneal was hit hard by rising water on the Staunton River. In Brookneal the Staunton crested at 39.7 feet Campbell County had excess water from Otter Creek, Seneca Creek and Falling River spilling into the Staunton. The historic Marysville Covered Bridge was destroyed. Trees were uprooted.</p>
September 18, 2003	<p>Hurricane Isabel was expected to take a northerly jog that spared central VA from the brunt of its wind and rain. At 5:15pm at least 3,000 residents from Roanoke and east to Lynchburg and Lovington were without power (American Electric). Declared state of emergency</p> <p>Appomattox County: Declared state of emergency; Appomattox county lost most of its power (supplied by Southside electric and Dominion power) said it would be several days before power was restored.</p> <p>Lynchburg City: Over three thousand people in the city were without power</p>

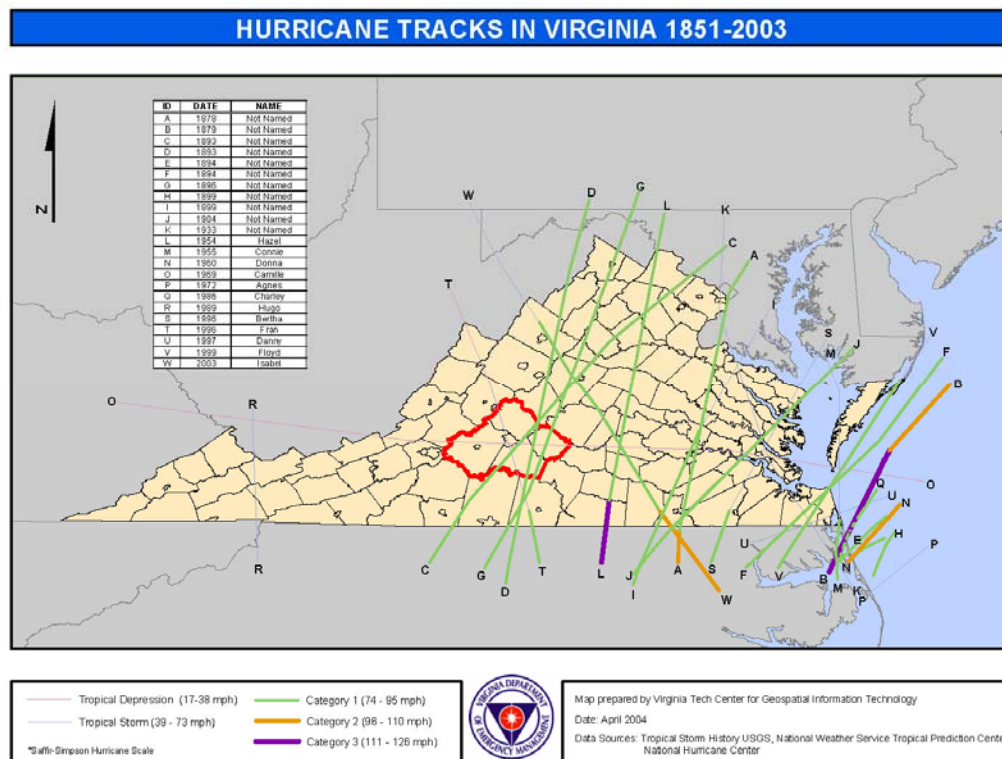


Figure V-16. Virginia Hurricane Tracks (from VDEM).

The Commonwealth of Virginia's Standard Hazard Mitigation Plan includes hurricane tracks in Virginia spanning from 1851 to 2003 (Figure V-16). The hurricane track map gives an idea of the historical occurrences in the Region 2000 RC. A majority of the hurricanes that have tracked through the Regional Commission were Category 1(not named in 1893, 1896, and 1893) with Tropical Depression Fran (1996) and Tropical Storm Camille (1969). It should be noted that Figure V-16 indicates the location of the center of the hurricane. Impacts from hurricanes could span many miles in all directions of the designated track.

Hazard Profile

A tropical cyclone is the generic term for a non-frontal synoptic scale low-pressure system that originates over tropical or sub-tropical waters with organized convection and definite cyclonic surface wind circulation. Depending on strength, they are classified as hurricanes or tropical storms. Tropical cyclones involve both atmospheric and hydrologic characteristics, such as severe winds, storm, surge flooding, high waves, coastal erosion, extreme rainfall, thunderstorms, lightning, and, in some cases, tornadoes. Storm surge



flooding can push inland, and riverine flooding associated with heavy inland rains can be extensive. High winds are associated with hurricanes, with two significant effects: widespread debris due to damaged and downed trees and damaged buildings; and power outages.

Secondary Hazards

Secondary hazards from a hurricane event could include high winds, flooding, heavy waves, and tornadoes. Once inland, the hurricane's band of thunderstorms produces torrential rains and sometimes tornadoes. A foot or more of rain may fall in less than a day causing flash floods and mudslides. The rain eventually drains into the large rivers, which may still be flooding for days after the storm has passed. The storm's driving winds can topple trees and utility poles, and damage buildings. Communication and electricity is lost for days and roads are impassable due to fallen trees and debris.

Hurricane Damage Scale

Hurricanes are categorized by the Safer-Simpson Hurricane Damage Scale listed below (Table V-21). Following the table are detailed descriptions of each category and the potential damage caused by each.



Table V-21. Saffir-Simpson Hurricane Damage Scale

Hurricane Category	Sustained Winds (mph)	Damage Potential	Description
1	74 - 95	Minimal	Minimal damage to unanchored mobile homes along with shrubbery and trees. There may be pier damage and coastal road flooding, with storm surge 4-5 feet about average.
2	96 - 110	Moderate	Moderate damage potential to mobile homes and piers, as well as significant damage to shrubbery and trees with some damages to roofs, doors and windows. Impacts include flooding 2-4 hours before arrival of the hurricane in coastal and low lying areas. Storm surge can be 6-8 feet above average.
3	111 - 130	Extensive	Extensive damage potential. There will be structural damage to small residences and utility buildings. Extensive damage is to mobile homes and trees and shrubbery. Impacts include flooding 3-5 hours before the arrival of the hurricane cutting off the low lying escape routes. Coastal flooding has the potential to destroy the small structures, with significant damage to larger structures as a result of the floating debris. Land that is lower than 5 feet below mean sea level can be flooded 8 or more miles inland. Storm surge can be 6-12 feet above average.
4	131 - 155	Extreme	Extreme damage potential. Curtain wall failure as well as roof structure failure. Major damage to lower floors near the shoreline. Storm surge generally reaches 13-18 feet above average.
5	> 155	Catastrophic	Severe damage potential. Complete roof failure on residence and industrial structures, with complete destruction of mobile homes. All shrubs, trees and utility lines blown down. Storm surge is generally greater than 18 feet above average.

Vulnerability Analysis

HAZUS-MH

HAZUS-MH was used to complete the wind analysis for vulnerability and loss estimates. The HAZUS software has been developed by FEMA and the Nation Institute of Building Sciences. Level 1, with default parameters, was used for the analysis done in this plan. For analysis purposes, the U.S. Census tracks are the smallest extent in which the model runs. The results of this analysis are captured in the vulnerability analysis and loss estimation.

HAZUS-MH uses historical hurricane tracks and computer modeling to identify the probabilistic tracks of a range of hurricane events. Appendix V-4 contains the individual wind speed maps (50-yr, 100-yr, and 1,000-yr events) for the jurisdictions in the region. When a hurricane impacts these areas, these maps can be used to determine what areas will be more impacted than others (at the U.S. Census Track level). Results from the model were used to develop the annualized damages. The impacts of these various events are combined to create a total annualized loss or the expected value of loss in any given



year. Figure V-14 illustrates the annualized damages from hurricane winds. It should be noted that these are climatologically trend tracks, and therefore the specified track, realistically, can vary significantly from what is shown.

Building Types

Table V-22 illustrates the probabilistic building stock exposure by building type to hurricanes. For the Region 2000 RC, wood-frame buildings account for a large percentage of the building stock. Table V-23 illustrates the building stock exposure broken down by the type of occupancy. From the table, 83% of the building stock for the Region 2000 RC is considered residential, with approximately 14% of the building stock coming from commercial and industrial.

HAZUS-MH hurricane model only conducts analysis at the U.S. Census track level; which is larger than all of the towns in the Region 2000 Regional Commission. Town exposure has been estimated based on the percentage of the housing units in the County.

Table V-22. Building Stock Exposure by Building Type (from HAZUS-MH). *denotes town values that are also included in totals for the perspective County.

Building Stock Exposure by Building Type						
Community	Wood	Masonry	Concrete	Steel	MH	TOTAL
Amherst County	\$1,088,291	\$466,536	\$78,671	\$135,504	\$55,740	\$1,824,742
*Amherst, Town of	\$83,986	\$36,004	\$6,071	\$10,457	\$4,302	\$140,820
Appomattox County	\$446,231	\$173,247	\$12,362	\$43,398	\$43,019	\$718,257
*Appomattox, Town of	\$58,727	\$22,800	\$1,627	\$5,711	\$5,662	\$94,527
*Pamplin City, Town of	\$6,814	\$2,646	\$189	\$663	\$657	\$10,969
Bedford City	\$238,566	\$124,589	\$27,091	\$58,111	\$1,090	\$449,447
Bedford County	\$2,513,542	\$976,105	\$70,447	\$206,432	\$166,762	\$3,933,288
Campbell County	\$1,649,161	\$676,211	\$59,213	\$233,111	\$161,113	\$2,778,809
*Altavista, Town of	\$123,194	\$50,514	\$4,423	\$17,414	\$12,035	\$207,580
*Brookneal, Town of	\$43,305	\$17,756	\$1,555	\$6,121	\$4,231	\$72,968
Lynchburg City	\$2,448,010	\$1,235,429	\$278,580	\$565,286	\$19,468	\$4,546,773
Total	\$8,383,801	\$3,652,117	\$526,364	\$1,241,842	\$447,192	\$14,251,316
All values are in thousands of dollars						



Table V-23. Building Stock Exposure by General Occupancy (from HAZUS-MH). *denotes town values that are also included in totals for the perspective County.

Building Stock Exposure By General Occupancy								
Community	Residential	Commercial	Industrial	Agri.	Religion	Gov't	Ed.	Total
Amherst County	\$1,584,986	\$142,958	\$50,622	\$3,360	\$28,601	\$939	\$13,277	\$1,824,743
*Amherst, Town of	\$122,317	\$11,032	\$3,907	\$259	\$2,207	\$72	\$1,025	\$140,820
Appomattox County	\$628,950	\$64,068	\$10,528	\$2,496	\$6,902	\$2,234	\$3,080	\$718,258
*Appomattox, Town of	\$82,774	\$8,432	\$1,386	\$328	\$908	\$294	\$405	\$94,527
*Pamplin City, Town of	\$9,605	\$978	\$161	\$38	\$105	\$34	\$47	\$10,969
Bedford City	337543	\$71,152	\$22,262	\$1,109	\$13,507	\$1,471	\$2,403	\$449,447
Bedford County	\$3,486,963	\$273,431	\$88,455	\$9,372	\$59,213	\$2,525	\$13,335	\$3,933,294
Campbell County	\$2,306,096	\$264,942	\$122,837	\$8,381	\$45,326	\$18,791	\$12,447	\$2,778,820
*Altavista, Town of	\$172,268	\$19,791	\$9,176	\$626	\$3,386	\$1,404	\$930	\$207,581
*Brookneal, Town of	\$60,555	\$6,957	\$3,226	\$220	\$1,190	\$493	\$327	\$72,968
Lynchburg City	\$3,502,793	\$694,372	\$196,531	\$3,514	\$95,804	\$5,863	\$47,899	\$4,546,776
Total	\$11,847,331	\$1,510,923	\$491,235	\$28,232	\$249,353	\$31,823	\$92,441	\$14,251,338
All values are in thousands of dollars								

Critical Facilities

Vulnerability to critical facilities from hurricane winds is fairly uniform throughout the region. As Figure V-17 shows, there is only slight variation in the region, with a few “hot spots”. Bedford County, Bedford City, Lynchburg City and Campbell County have a slightly larger annualized hurricane loss when compared to Amherst and Appomattox Counties. Table V-26 illustrates the percentage of critical facilities in the different annualized loss categories. Critical facilities that are located within towns have been included in the county totals. Future updates of this plan will hopefully include a region wide comprehensive database for critical facilities.

Loss Estimation

Table V-24 provides the loss estimations from HAZUS-MH by building type. As noted earlier, wood structures compose the majority of the structures, and also account for the majority of the losses. Table V-25 shows the loss by occupancy type. Note the differences between the totals in the tables are due to rounding in the calculations in HAZUS-MH.

HAZUS-MH hurricane model only conducts analysis at the U.S. Census tract level; which is larger than all of the towns in the Region 2000 Regional Commission. Town building stock loss has been estimated based on the percentage of the housing units in the County.



Table V-24. Building Stock Loss by Building Type (from HAZUS-MH). *denotes town values that are also included in totals for the perspective County.*denotes totals included in the perspective County.

Building Stock Loss by Building Type						
Community	Wood	Masonry	Concrete	Steel	MH	TOTAL
Amherst County	\$106.52	\$39.52	\$2.11	\$5.86	\$5.86	\$159.87
*Amherst, Town of	\$8.22	\$3.05	\$0.16	\$0.45	\$0.45	\$12.34
Appomattox County	\$55.77	\$17.73	\$0.40	\$1.87	\$5.39	\$81.16
*Appomattox, Town of	\$7.34	\$2.33	\$0.05	\$0.25	\$0.71	\$10.68
*Pamplin City, Town of	\$0.85	\$0.27	\$0.01	\$0.03	\$0.08	\$1.24
Bedford County	\$243.01	\$81.25	\$1.72	\$7.68	\$19.61	\$353.27
Bedford City	\$29.34	\$12.80	\$1.01	\$3.66	\$0.14	\$46.96
Campbell County	\$190.29	\$69.36	\$2.24	\$11.24	\$19.18	\$292.32
*Altavista, Town of	\$14.21	\$5.18	\$0.17	\$0.84	\$1.43	\$21.84
*Brookneal, Town of	\$5.00	\$1.82	\$0.06	\$0.30	\$0.50	\$7.68
Lynchburg City	\$299.48	\$138.05	\$10.80	\$35.27	\$2.55	\$486.15
Total	\$924.41	\$358.72	\$18.28	\$65.59	\$52.73	\$1,419.73
<i>*All values are in thousands of dollars</i>						

Table V-25. Building Stock Loss by General Occupancy (from HAZUS-MH). *denotes town values that are also included in totals for the perspective County.

Building Stock Loss By General Occupancy								
Community	Residential	Commercial	Industrial	Agri.	Religion	Gov't	Ed.	Total
Amherst County	\$148.75	\$6.12	\$3.03	\$0.18	\$1.03	\$0.04	\$0.55	\$159.70
*Amherst, Town of	\$11.48	\$0.47	\$0.23	\$0.01	\$0.08	\$0.00	\$0.04	\$12.32
Appomattox County	\$77.27	\$2.71	\$0.56	\$0.16	\$0.26	\$0.18	\$0.13	\$81.27
*Appomattox, Town of	\$10.17	\$0.36	\$0.07	\$0.02	\$0.03	\$0.02	\$0.02	\$10.70
*Pamplin City, Town of	\$1.18	\$0.04	\$0.01	\$0.00	\$0.00	\$0.00	\$0.00	\$1.24
Bedford County	\$335.38	\$10.96	\$4.20	\$0.57	\$1.99	\$0.06	\$0.50	\$353.66
Bedford City	\$40.02	\$4.40	\$1.52	\$0.09	\$0.68	\$0.13	\$0.13	\$46.97
Campbell County	\$268.54	\$12.74	\$8.04	\$0.52	\$1.81	\$0.88	\$0.53	\$293.06
*Altavista, Town of	\$20.06	\$0.95	\$0.60	\$0.04	\$0.14	\$0.07	\$0.04	\$21.89
*Brookneal, Town of	\$7.05	\$0.33	\$0.21	\$0.01	\$0.05	\$0.02	\$0.01	\$7.70
Lynchburg City	\$418.23	\$45.11	\$15.25	\$0.30	\$4.72	\$0.48	\$2.75	\$486.84
Total	\$1,288.19	\$82.03	\$32.60	\$1.82	\$10.49	\$1.77	\$4.60	\$1,421.50
<i>* All values are in thousands of dollars</i>								

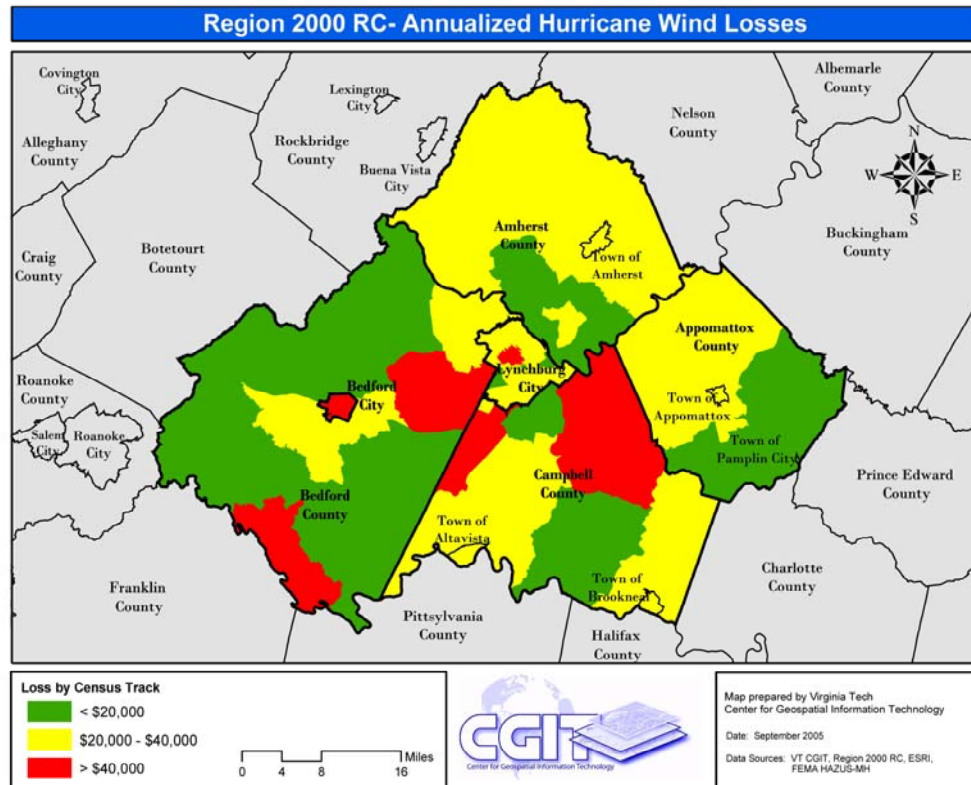


Figure V-17. Region 2000 RC Annualized Total Hurricane Loss Estimate (Census Tracts).

Table V-26. Region 2000 RC Percentage of Annual Hurricane Loss by Critical Facility

Community	<\$20,000	\$20,000 - \$40,000	>\$40,000
Amherst County	21%	79%	0%
Appomattox County	22%	78%	0%
Bedford County	62%	12%	26%
Bedford City	0%	0%	100%
Campbell County	15%	51%	34%
Lynchburg City	14%	81%	4%

Problem Spot Mapping

See Appendix V-1 for Figures and Tables summarizing the problem spot locations that were denoted by the steering committee and public input. When specific town information was provided it was included on the problem spot maps. If no information was provided by the localities, or they acknowledged there was no need for a specific map, the map was omitted from the Appendix.



Tornado Wind (Medium Ranking)

Hazard History

Table V-27 includes descriptions of major tornado events that have touched down in the Region 2000 RC. Events have been broken down by the date of occurrence and when available, by individual community descriptions. When no community specific description is available, the general description should be used as representing the entire planning area.

Table V-27. Tornado Hazard History

Date	Damages
February 1, 1951	Appomattox County: Miniature twister struck and demolished an Appomattox farm.
May 14, 1976	A strong line of thunderstorms produced several small tornadoes in the region. Amherst County: A small tornado along Old Winesap Road took the roof off of one home; one mobile home was knocked off its foundation; tree limbs were downed. No injuries were reported.
March 21, 1984	Campbell County: Touched down in Altavista and remained on the ground for 3/4 of a mile, clearing a path 200 yards wide.
March 22, 1984	A severe thunderstorm passed through the region in the middle of the night with high winds and one tornado. Town of Altavista: A minor tornado touched down for three-quarters of a mile and cleared a path 200 yards wide. The tornado destroyed a barn, two sheds, two campers, and several fence lines. No injuries were reported. Bedford County: About 500 customers lost power. Campbell County: Roads were littered with over 40 downed trees
July 9, 1990	Amherst County: A tornado touched down near Pleasant View farm. Minor damage to one house and barn were reported, with no injuries.
June 10, 1996	A severe thunderstorm whipped through the south end of Campbell County Monday, with tornadoes touching down in Henry and Pittsylvania County. A tornado ripped the roof off a house on Virginia route 640. Campbell County: Staunton River reached a crest of about 18 feet. A funnel cloud was also sighted near William Campbell High School.
July 15, 1996	A fierce storm, possibly a tornado, whipped through the City of Bedford and the surrounding areas Monday afternoon, damaging several homes. Bedford City: Damage reported in the vicinity of Macon and Peaks Streets, and Lake and Whitfield Drives. House damaged on Rough Drive. A tornado caused damage near Stewartsville and near a saw mill north of US 460. Damages from the storm were estimated at \$200,000.



Date	Damages
April 17, 2000	<p>Thunderstorms during the late morning through evening of the 17th generated a tornado, and produced hail up to one and three quarter inches in diameter, damaging winds, flash flooding, and lightning damage. A tornado briefly touched down in a field in Gladys. No damage was reported. Lightning struck a house 2 miles north of Altavista, starting a fire that burned to house to the ground. A second house in Brookneal was struck by lightning starting a fire that caused minor damage.</p> <p>Campbell County: A tornado briefly touched down in a field west of Gladys, no damage was reported. A house in Brookneal was struck by lightning, starting a fire that caused minor damage.</p> <p>Altavista: The storm drove into the southwestern portion of the county, pelting Altavista with dime-sized hail and carrying showers and thunderstorms into the north of the County. Lightning struck a house 2 miles north of Altavista, starting a fire that burned the house to the ground.</p>
April 28, 2002	<p>Two tornadoes swirled through Bedford and Campbell counties damaging hundreds of homes and businesses, knocking down power lines and injuring several people. More than 200 homes, 6 businesses, 2 churches damaged and 20 recreational vehicles damaged.</p> <p>Bedford County: Damages estimated over 6 million dollars.</p> <p>Bedford City: Estimated 1.6 million dollars in damage. 130 homes affected, 12 mobiles destroyed and 8 single family homes destroyed.</p> <p>Campbell County: Damages estimated at over 2.75 million dollars. Damages included 15 homes, 3 businesses and 1 church destroyed.</p>

Hazard Profile

Damaging winds typically are associated with tornadoes or land falling hurricanes. Isolated “downburst” or “straight-line” winds associated with any common thunderstorm can also cause extensive property damage.

Tornadoes are classified as a rotating column of wind that extends between a thunderstorm cloud and the earth’s surface. Winds are typically less than 100 mph, with severe tornado wind speeds exceeding 250 mph. The rotating column of air often resembles a funnel-shaped cloud. The widths of tornadoes are usually several yards across, with infrequent events being over a mile wide. Tornadoes and their resultant damage can be classified into six categories using the Fujita Scale (see Table V-28). This scale assigns numerical values for wind speeds inside the tornado according to the type of damage and degree of the tornado. Most tornadoes are F0 and F1, resulting in little widespread damage. Tornado activity normally spans from April through July but tornadoes can occur at any time throughout the year. In Virginia, peak tornado activity is in July. Hot, humid conditions stimulate the tornadoes growth.

Strong tornadoes may be produced by thunderstorms and often are associated with the passage of hurricanes. On average, about seven tornadoes are reported in Virginia each



year. The total number may be higher as incidents may occur over areas with sparse populations, or may not cause any property damage.

Tornadic thunderstorms also produce hail. Hailstorms are also outgrowths of severe thunderstorms. During summer months, when the difference between ground and upper level temperatures is significant, hail may develop. The size of the hailstones is directly related to the severity and size of the storm. Hail is described as chunks of ice, often in a spherical or oblong shape, that are produced by thunderstorms. The size of the hail greatly affects the magnitude or severity of damage. Storms can produce hail from as small as ¼ inch in diameter to up to 4 ½ inches. Depending on the size of hail determines the potential damage.



Table V-28. Fujita Tornado Intensity Scale (From National Weather Service)

Classification	Max. Winds (mph)	Path Length (mi.)	Path Width (mi)	Damage
F0	less than 73	less than 1.0	less than 0.01	Chimneys damaged, trees broken
F1	73-112	1.0-3.1	0.01-0.03	Mobile homes moved off foundations or overturned
F2	113-157	3.2-9.9	0.03-0.09	Considerable damage, mobile homes demolished, trees uprooted
F3	158-206	31-Oct	0.10-0.29	Roof and walls torn down, trains overturned, cars thrown
F4	207-260	32-99	0.30-0.90	Well-constructed walls leveled
F5	261-318	100-315	1.0-3.1	Homes lifted off foundations and carried some distance, cars thrown as far as 300 ft

The classification of the tornado gives an approximate depiction of what the corresponding damage of the tornado will be. A majority of Virginia's tornadoes are F0 and F1 on the Fujita Scale, shown in Table V-29. These result in minimal extensive damage. Damage that is likely to occur would be damage to trees, shrubbery, signs, antennas, with some damage to roofs and unanchored trailers.



Table V-29. Virginia Tornado Statistics 1950-2001

Fujita Scale	Class.	MPH	Damage Description	# in VA	%	Deaths / Injuries	Damages (\$ Mil)
F0	Weak	40-72	Light damage. Tree branches snapped; antennas and signs damaged.	99	26	0 / 0	7
F1	Moderate	73-112	Moderate damage. Roofs off; trees snapped; trailers moved or overturned.	186	50	Jan-85	57
F2	Strong	113-157	Considerable damage. Weak structures and trailers demolished; cars blown off road.	66	18	Mar-72	75
F3	Severe	158-206	Roofs and some walls torn off well constructed buildings; some rural buildings demolished; cars lifted and tumbled.	23	6	19 / 102	140
F4	Devastating	207-260	Houses leveled leaving piles of debris; cars thrown some distance.	2	0.1	4 / 248	50
F5	Incredible	261-318	Well built houses lifted off foundation and disintegrated with debris carried some distance.	0	0	n/a	n/a

Table V-30 and Figure V-18 show tornado occurrences in the region. Some areas in the region appear to be slightly more prone to tornadoes than others, especially in central Bedford County and Bedford City. It is thought that this is caused by topographical influences on thunderstorms such as the change in low-level wind flow and humidity caused by the orientation of the mountains. The probability of future occurrences of tornados is definite; predicting the potential locations for such events is inappropriate. Since tornadoes are so infrequent and sporadic for the region, the Hurricane Wind analysis covers more probable high wind occurrences.



Table V-30. Region 2000 RC Tornado Statistics by Fujita Intensity Scale.

Tornado Touchdowns				
County	F0	F1	F2	Total
Amherst County	2	0	0	2
Appomattox County	0	1	0	1
Bedford County	0	2	2	4
Bedford City	0	1	1	2
Campbell County	2	2	2	6
Lynchburg City	0	0	0	0
Total	4	6	5	15

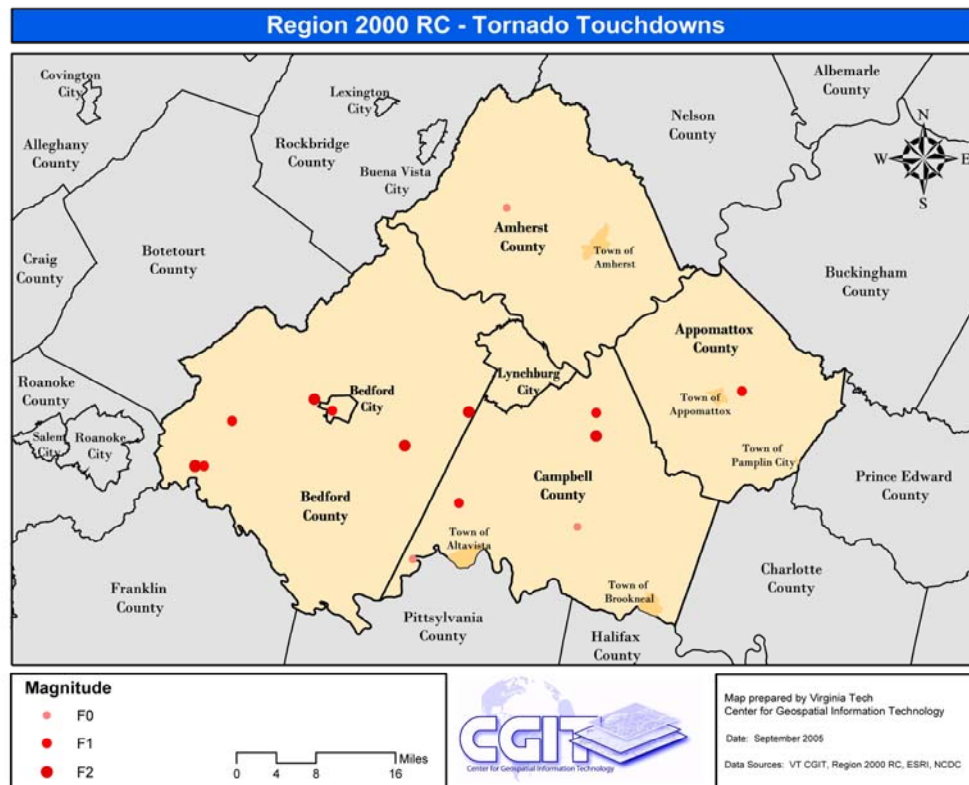


Figure V-18. Region 2000 RC Tornado Touchdowns.



Wildfire (Medium Ranking)

Hazard History

The Virginia Department of Forestry website provided fire incidence data for fire years 1995-2001. The data provided by VDOF was summarized into the following tables.

Note that the tables do not include data for towns or cities; this data was not available through VDOF. Table V-31 provides information on the breakdown of number of acres burned and the total amount of damage per county. Table V-32 illustrates the cause of fire broken down by county. It is noted that the largest percentages of wildfires were caused by debris (44%), followed by 22% from miscellaneous causes.

Table V-31. Wildfire Summary 1995-2001 (from VDOF).

Fire Year	1995		1996		1997		1998	
County	Total Acres	Total Damage	Total Acres	Total Damage	Total Acres	Total Damage	Total Acres	Total Damage
Amherst County	0	\$0	17	\$6,000	9	\$3,160	17.7	\$800
Appomattox County	94	\$42,150	3.5	\$5,000	32.9	\$1,000	11.8	\$1,200
Bedford County	60.6	\$10,050	21.2	\$1,150	40.3	\$3,950	11.8	\$1,000
Campbell County	40.4	\$10,150	43.4	\$30,700	44.8	\$14,800	130.2	\$8,200
Total	195	\$62,350	85	\$42,850	127	\$22,910	172	\$11,200

Fire Year	1999		2000		2001		Acres Total	Damages Total
County	Total Acres	Total Damage	Total Acres	Total Damage	Total Acres	Total Damage		
Amherst County	95.2	\$5,300	103.9	\$1,960	98.5	\$21,050	341.3	\$38,270
Appomattox County	71.6	\$20,000	11.8	\$0	423.3	\$75,800	648.9	\$145,150
Bedford County	39.1	\$4,700	464.5	\$9,751	66.6	\$36,060	704.1	\$66,661
Campbell County	56.6	\$5,770	25.7	\$15,100	325.7	\$18,225	666.8	\$102,945
Total	263	\$35,770	606	\$26,811	914	\$151,135	2,361	\$353,026

Table V- 32. Wildfire Causes 1995-2001 (from VDOF).

Wildfires By Cause										
County	Lightening	Camp Fire	Smoking	Debris	Incendiary	Equip. Use	R&R	Child	Misc.	Total
Amherst County	0	1	10	37	5	6	1	9	22	91
Appomattox County	6	1	5	24	7	13	13	7	24	100
Bedford County	5	0	5	29	13	10	20	5	13	100
Campbell County	1	1	8	125	26	13	2	16	61	253
Grand Total	12	3	28	215	51	42	36	37	120	544



Hazard Profile

Wildfire is a unique hazard in that it can be significantly altered based on efforts to control its course during the event. The Virginia Department of Forestry (VDOF) indicates that there are three principle factors that can lead to the formation of wildfire hazards: topography, fuel, and weather. The environmental conditions that exist during these seasons exacerbate the hazard. When relative humidity is low and high winds are coupled with a dry forest floor (brush, grasses, leaf litter), wildfires may easily ignite. Years of drought can lead to environmental conditions that promote wildfires. Accidental or intentional setting of fires by humans is the largest contributor to wildfires. Residential areas or “woodland communities” that expand into wildland areas also increase the risk of wildfire threats.

Fire Seasons

Spring (March and April) and fall (October and November) are the two seasons for wildfires.

Secondary Effects

Secondary effects from wildfires can pose a significant threat to the communities surrounding the hazard. During a wildfire, the removal of groundcover that serves to stabilize soil can potentially lead to hazards such as landslides, mudslides, and flooding. In addition, the leftover scorched and barren land may take years to recover and the resulting erosion can be problematic.

Vulnerability Analysis

Hazard Areas

Figure V-19 shows the wildfire hazard map developed by VDOF. In 2002 and 2003, VDOF examined which factors influence the occurrence and advancement of wildfires and how these factors could be represented in a GIS model. VDOF determined that historical fire incidents, land cover (fuels surrogate), topographic characteristics, population density, and distance to roads were critical variables in a wildfire risk analysis. The resulting high, medium, and low risk category reflect the results of this analysis. Campbell County has a large portion in the high potential category for wildfire risk, followed by Amherst County, Town of Amherst, Bedford County and Appomattox County. The bands of high potential could be a result of the state and national forests and parks located throughout the region.

Department of Forestry

Table 33 illustrates the number of homes within woodland communities, as designated by Virginia Department of Forestry, in the Region 2000 RC. For Region 2000 RC, 33% of the woodland homes fall into the high potential for a wildfire. Amherst County has the highest relative percentage of homes in areas of high wildfire potential at 63% of homes in the highest risk category. Bedford County has the second highest relative risk for



wildfire with 32% of woodland homes at risk. Table V-34 provides a breakdown of the number of critical facilities in wildfire prone areas. Campbell and Amherst Counties have a relatively high percentage of critical facilities at risk (49%, 44 %) followed by Bedford County (32%). Overall, the Region 2000 RC has a relatively low number of critical facilities at risk to wildfire (37%) events. Figures and tables in Appendix V-1 summarize the problem spot locations that were denoted by committee members.

Table V-33. Woodland Homes Wildfire Risk.

Number of Woodland Homes by Fire Rank				
County	Medium Potential	High Potential	Grand Total	% High Risk
Amherst County	20	12	32	63%
Appomattox County	0	2	2	0%
Bedford County	18	38	56	32%
Campbell County	1	29	30	3%
Total	39	81	120	33%

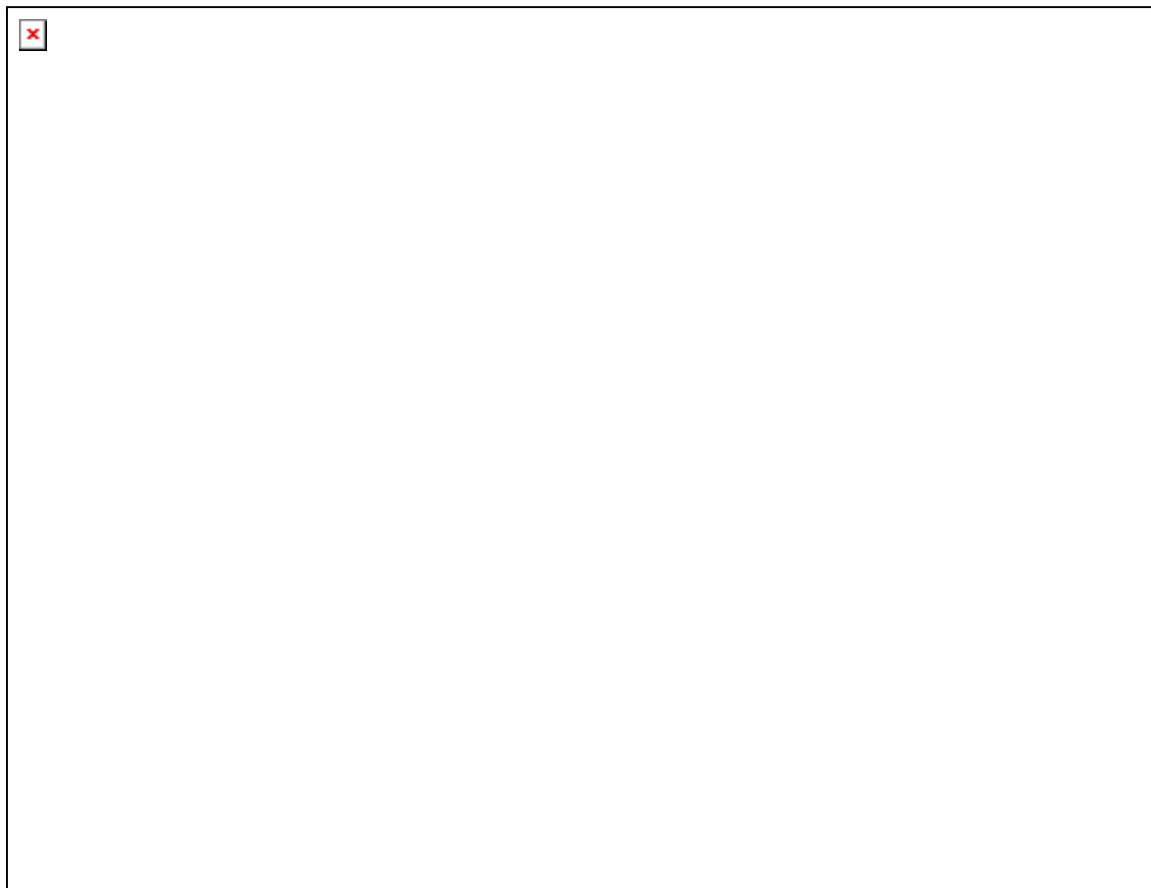


Figure V-19. Region 2000 RC Wildfire Vulnerability.



Table V-34. Region 2000 RC Critical Facilities Wildfire Vulnerability.

Number of Critical Facilities by Fire Risk					
Community	Low Potential	Medium Potential	High Potential	Total	% in High Risk
Amherst County	18	182	154	354	44%
Appomattox County	28	56	27	111	24%
Bedford County	21	258	130	409	32%
Bedford City	0	36	11	47	23%
Campbell County	56	124	173	353	49%
Lynchburg City	61	14	15	90	17%
Total	184	670	510	1364	37%



Landslide and Land Subsidence (Low Ranking)

Hazard History

No detailed hazard history was available for the regional commission. Figures V-20 and V-21 illustrate potential risk areas for the Commonwealth of Virginia.

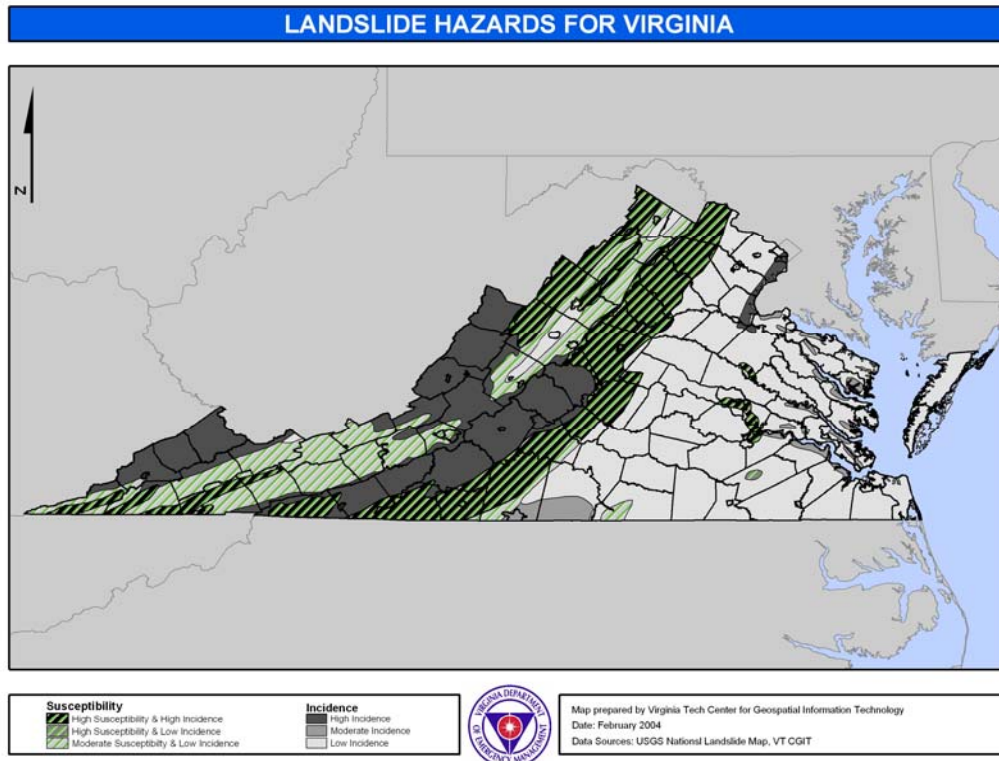


Figure V- 20. USGS Landslide Susceptibility and Incidence in Virginia (VDEM).

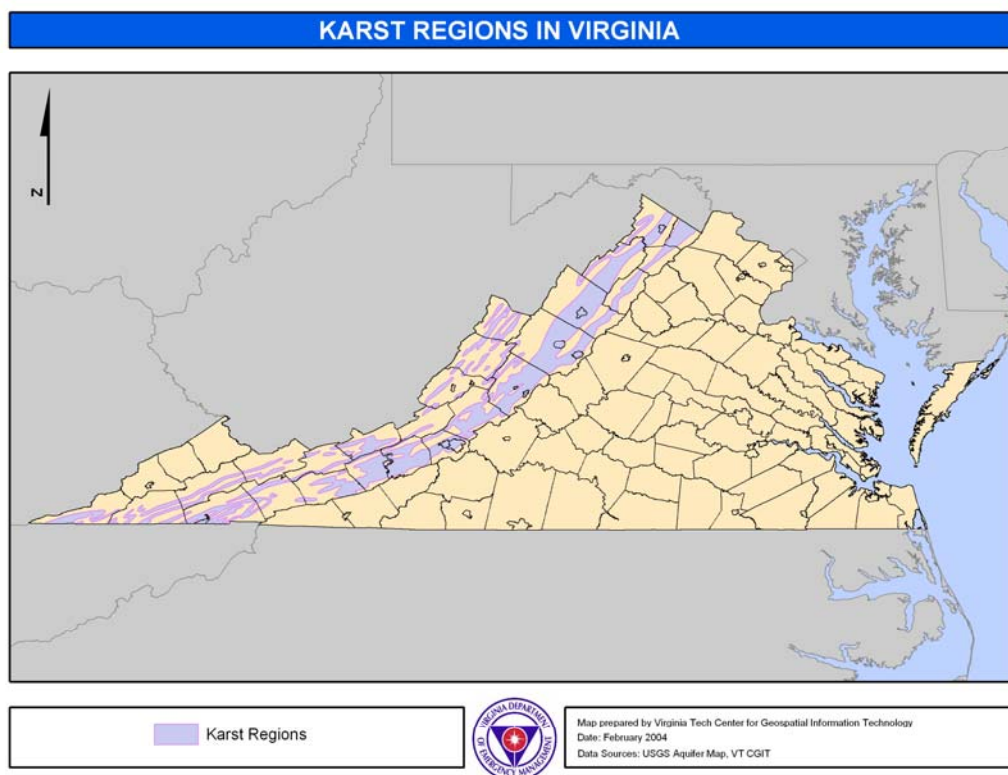


Figure V-21. Karst Regions in Virginia (VDEM).

Hazard Profile

Land subsidence is the lowering of surface elevations due to changes made underground. The USGS notes that land subsidence is usually caused by human activity such as pumping of water, oil, or gas from underground reservoirs. Land subsidence often occurs in regions with mildly acidic groundwater and the geology is dominated by limestone, dolostone, marble or gypsum. Karst is the term used to refer to geology dominated by limestone and similar soluble rocks. The acidic groundwater dissolves the surrounding geology creating sinkholes. Sinkholes are classified as natural depressions of the land surface. Areas with large amounts of karst are characterized by the presence of sinkholes, sinking streams, springs, caves and solution valleys.

The term “landslide” is used to describe the downward and outward movement of slope-forming materials reacting under the force of gravity. The term covers a broad category of events, including mudflows, mudslides, debris flows, rock falls, rock slides, debris avalanches, debris slides, and earth flows. These terms vary by the amount of water in the materials that are moving.

Several natural and human factors may contribute to or influence landslides. How these factors interrelate is important in understanding the hazard. The three principal natural



factors are topography, geology, and precipitation. The principle human activities are cut-and-fill construction for highways, construction of buildings and railroads, and mining operations.

The USGS recognizes four major impacts caused by land subsidence:

- Changes in elevation and slope of streams, canals, and drains
- Damage to bridges, roads, railroads, storm drains, sanitary sewers, canals, and levees
- Damage to private and public buildings
- Failure of well casings from forces generated by compaction of fine-grained materials in aquifer systems

Landslides can cause serious damage to highways, buildings, homes, and other structures that support a wide range of economies and activities. Landslides commonly coincide with other natural disasters. Expansion of urban development contributes to greater risk of damage by landslides.

Hazard Areas

The Region 2000 Regional Commission is located adjacent to the edge of the karst regions in Virginia (Figure V-21). Campbell and Appomattox Counties have a higher relative susceptibility to landslides comparative to the rest of the Regional Commission.

Problem Spot Mapping

See Appendix V-1 for Figures and Tables summarizing the problem spot locations that were denoted by the steering committee. These are areas of concern that were designated by the steering committee and public. When specific town information was provided it was included on the problem spot maps. If no information was provided by the localities, or they acknowledged there was no need for a specific map, the map was omitted from the Appendix.



Terrorism (Low Ranking)

Hazard History

No terrorism history was available for the regional commission at this time. Several of the communities in the region provided information about their Emergency Operation Plans (EOP). These plans are beginning to address terrorism as a concern in operation. Please consult local EOPs for further guidance.

The FEMA risk management series on mitigating potential terrorist attacks against buildings provides information on developing a realistic prioritization of human-caused hazards. The mitigation strategies section on this report should provide projects to address human caused hazard vulnerability. Future concepts to consider include:

- I. Communities determine the relative importance of various critical and non-critical facilities and the asset of these systems
- II. Determine the vulnerability to the specified hazard
- III. Determine what threats are known to exist in the communities

Hazard Profile

Currently there is no universal definition for terrorism. Terror can be exhibited through many different forms. The code of Federal Regulations defines terrorism as “the unlawful use of force and violence against persons or property to intimidate or coerce a government, civilian population, or any segment thereof, in furtherance of political or social objectives.”

Hazard Areas

Local Emergency Operation Plans are beginning to address annexations and terrorism areas of concern. Consult these plans for further information.

Vulnerability Analysis

Vulnerability analysis, when available, has been conducted by the different localities. This information has been addressed in local Emergency Operation Plans.



Plan Linkage

The *Hazard Identification and Risk Assessment (HIRA)* takes a hazard specific approach in determining the regions concerns and vulnerabilities are. The information provided should be used as one of its planning tools in mitigating hazards. At this point in time data limitations provide a stumbling block in determining pinpoint locations of hazards. This HIRA provides broad regional information that the communities should use in developing their mitigation actions.

Section VI on *Mitigation Actions* uses the HIRA findings and applies it to current and potential mitigation actions that will lessen the impacts from the hazards of concern. The Mitigation section bridges the gap of where the “problem spots” are and how they can mitigate them so they become less of a problem.



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Mitigation

§201.6(c)(3) A mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section shall include:

- (i) A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.
- (ii) A section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.
- (iii) An action plan describing how the actions identified in paragraph (c)(2)(i) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review and their associated costs.
- (iv) For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

There are many reasons why mitigation is important. The *number one* reason is for the assurance that the jurisdictions remain eligible for FEMA funding programs in the likelihood that the communities are involved in a disaster. The *second reason* to participate is to design and develop mitigation projects to be completed within the community. Hazard damage amounts substantially decrease when communities have mitigation projects and strategies in place. By becoming involved in the process it allows the communities to focus their efforts on specific hazard areas by incorporating and setting priorities for mitigation planning efforts.

Vision and Goals

The mitigation methods that were used for the Region 2000 Hazard Mitigation Plan mirror the Commonwealth of Virginia's plan. During the steering committee meeting on mitigation methods, a number of methods were proposed to see how the committee wanted to develop this section of the plan. Members of the steering committee felt that the Commonwealth's plan highlighted the major categories they wanted to use in their communities. The regional vision statement was developed based on what the steering committee felt was crucial in the long-term enhancement of the plan.



The vision for the Region 2000 Regional Commission's Hazard Mitigation Plan is to lessen the impacts from natural and manmade hazards, prepare the region to respond to future events, and encourage regional collaboration by pursuing funding and promoting mitigation actions focusing on structural projects, education, information and data development, and policy and planning.

The four basic action categories and definitions being:

I. Structural Mitigation Projects:

- Identify and implement physical projects that will directly reduce impacts from hazards.

II. Policy & Planning:

- Incorporate mitigation concepts and objectives into existing and future policies, plans, regulations and laws in the Commonwealth.

III. Information and Data Development:

- Build capacity with information and data development to refine hazard identification and assessment, mitigation targeting and funding identification.

IV. Education and Outreach Activities:

- Through education and training, increase awareness of hazards and potential mitigation strategies.



Action Development

Mitigation actions were developed by CGIT using the Hazard Identification and Risk Assessment results, problem spot maps provided by the localities and community input. General actions were developed for the region as a whole and further sculpted into region specific actions at the individual community action meetings. Appendix VI-1 contains the detailed project forms for each of the communities. “Action Packets” were handed out and explained to the committee members during one of the steering committee meetings for the jurisdictions to review prior to the community action meetings. The “Action Packet” is available in Appendix VI-2. Additional packets were provided to be distributed to the stakeholders that would be present at the community meetings.

The committee members were responsible for inviting local stakeholders to attend the action meetings and provide input to the plan. Examples of stakeholders that were invited include emergency responders, zoning officials, and planners. Response and input from the stakeholders was invaluable to this section of the plan. Their feedback helped to mold the actions for their communities and provide information on what types of mitigation is currently being completed. Appendix VI-4 details the attendance at each of these meetings.

The “Action Packets” include a cover page that details the goal type, action name, reference number, and hazards addressed the pages after the table provides detailed information on the action. An example of the action form (Figure VI-1) contains information regarding the communities involved in implementing the action, type of action, hazards addressed, project description, responsible organization, potential funding sources and timeframe for action completion. Additional action forms were completed after the jurisdictional meetings to take account of the actions discussed.

Three different types of actions were developed for the region. The different types of actions were based on the region’s and communities needs and capacities for completing the various actions.

Mitigation Actions detail the actions that were proposed in the “Action Packets” handed out to the steering committee. During the jurisdictional meetings these packets were fleshed out to determine what projects the communities thought were applicable to their regions. Table VI-1 details how the communities ranked the projects.

The second type of action is denoted as Regional Actions. Regional Actions are the projects that all of the participating jurisdictions are involved in, with the regional commission often taking the lead on the project.

Jurisdictional Actions are specific to the jurisdiction. These projects were independently proposed by the jurisdictions because of a specific need in their community. Multiple



communities may have suggested the same action; these will be completed by the community depending on constraints of available resources.

<p style="text-align: center;">Region 2000 Regional Commission Hazard Mitigation Plan Proposed Mitigation Actions</p> <p>Title of Action: _____</p> <p>Communities Involved: _____</p> <p>Type of Action:</p> <table border="0"> <tr> <td><input type="checkbox"/> Structural Mitigation</td> <td><input type="checkbox"/> Information & Data Development</td> </tr> <tr> <td><input type="checkbox"/> Policy & Planning</td> <td><input type="checkbox"/> Education & Outreach</td> </tr> </table> <p>Hazards Addressed in Action:</p> <table border="0"> <tr> <td><input type="checkbox"/> Severe Winter Weather</td> <td><input type="checkbox"/> Wildfire</td> </tr> <tr> <td><input type="checkbox"/> Flood</td> <td><input type="checkbox"/> Landslide/Land Subsidence</td> </tr> <tr> <td><input type="checkbox"/> Drought</td> <td><input type="checkbox"/> Terrorism</td> </tr> <tr> <td><input type="checkbox"/> Wind</td> <td><input type="checkbox"/> Earthquake</td> </tr> </table> <p>Action Description: _____ _____ _____ _____ _____ _____ _____</p>	<input type="checkbox"/> Structural Mitigation	<input type="checkbox"/> Information & Data Development	<input type="checkbox"/> Policy & Planning	<input type="checkbox"/> Education & Outreach	<input type="checkbox"/> Severe Winter Weather	<input type="checkbox"/> Wildfire	<input type="checkbox"/> Flood	<input type="checkbox"/> Landslide/Land Subsidence	<input type="checkbox"/> Drought	<input type="checkbox"/> Terrorism	<input type="checkbox"/> Wind	<input type="checkbox"/> Earthquake	<p style="text-align: center;">Region 2000 Regional Commission Hazard Mitigation Plan Proposed Mitigation Actions</p> <p>HIRA Reference include section number(s): _____</p> <p>Responsible Organizations/Communities: _____</p> <p>Action Timeline: _____</p> <p>Estimated Cost to Complete Action: _____</p> <p>Potential Funding Sources: _____ _____ _____ _____</p> <p>Potential Contacts: _____</p> <p>Reference Links: _____ _____ _____ _____</p>
<input type="checkbox"/> Structural Mitigation	<input type="checkbox"/> Information & Data Development												
<input type="checkbox"/> Policy & Planning	<input type="checkbox"/> Education & Outreach												
<input type="checkbox"/> Severe Winter Weather	<input type="checkbox"/> Wildfire												
<input type="checkbox"/> Flood	<input type="checkbox"/> Landslide/Land Subsidence												
<input type="checkbox"/> Drought	<input type="checkbox"/> Terrorism												
<input type="checkbox"/> Wind	<input type="checkbox"/> Earthquake												

Figure VI-1. Sample Action Form.

Mitigation Actions

Community Ranking

Meetings were held for the participating jurisdictions (see Section IV on the Planning Process). These meetings led to in-depth discussions about local concerns and ways to address them. Each community prioritized the actions by ability and ease to implement the action, political will, action benefits versus the cost, community need and availability of various funding sources. The STAPLE(E) method listed below was also utilized during prioritization. The general actions were changed and expanded to detail the community specific needs, using the framework developed by CGIT.

The STAPLE(E) prioritization method takes into account seven criteria:

1. Socially Acceptable
2. Technically feasible
3. Administrative support
4. Politically acceptable
5. Legal
6. Economically justifiable
7. Environmentally responsive



Other considerations when prioritizing will be how well the project reduces future losses, how they further the goals and objectives put forth in this plan, and the cost versus the benefit of the project.

Table VI-1 illustrates how each of the jurisdictions ranked the actions that were appropriate for their community. Appendix VI-1 contains the detailed action worksheets divided by jurisdiction.



Region 2000 Regional Commission
Multi-Jurisdictional Hazard Mitigation Plan
Mitigation Section

Table VI-1. Region 2000 RC Mitigation Action Ranking

Type	Action Number	Action	Campbell County			Bedford County	Bedford City	Lynchburg City	Amherst County		Appomattox County		
			Campbell County	Town Altavista	Town Brookneal				Amherst County	Town Amherst	Appomattox County	Town Appomattox	Town Pamplin City
Education & Outreach	1-1	Weather Related Hazards Education	Medium	Medium	Medium	Medium		High	Low	Low	Medium	Medium	Medium
Education & Outreach	1-2	National Weather Service Storm Ready Program Application	High			High		High					
Education & Outreach	1-3	Weather Alert Radio System	Medium										
Education & Outreach	1-4	Drought Mitigation - Education on alleviating conditions	Medium	Medium	Medium		Medium		Low	Low			
Education & Outreach	1-5	Dry Hydrant Installation - Location Optimization	Low			Medium			Low	Low			
Education & Outreach	1-6	Money for Wildfire Mitigation									Low	Low	Low
Education & Outreach	1-7	Training on the importance of maintaining Right of Ways		Medium	Medium			Low					
Information & Data Development	2-1	Monitor Road Cleanup Following Hazard Events						Low					



Region 2000 Regional Commission
Multi-Jurisdictional Hazard Mitigation Plan
Mitigation Section

Type	Action Number	Action	Campbell County			Bedford County	Bedford City	Lynchburg City	Amherst County		Appomattox County		
			Campbell County	Town Altavista	Town Brookneal				Amherst County	Town Amherst	Appomattox County	Town Appomattox	Town Pamplin City
Information & Data Development	2-2	National Weather Service Storm Ready Data Collection				High		High					
Information & Data Development	2-3	Floodplain Updates and Assessment of What's At Risk	Medium	Medium	Medium	Medium			Medium	Medium	Low	Low	Low
Information & Data Development	2-4	Undergrowth Cleaning/ Prescribed Burns - VDOF & local collaboration	Low			Low							
Policy & Planning	3-1	National Weather Service Storm Ready Operations Plan	High					High					
Policy & Planning	3-2	Building Code Enforcement				Low							
Policy & Planning	3-3	Drought Mitigation - Voluntary restrictions					Medium	Low	Low	Low			
Policy & Planning	3-4	Undergrowth Cleaning/ Prescribed Burns	Low			Low							
Policy & Planning	3-5	Integrating Human Caused Hazards into EOPs	Low	Low	Low		Medium	Medium	Medium	Medium	Medium	Medium	Medium



Region 2000 Regional Commission
Multi-Jurisdictional Hazard Mitigation Plan
Mitigation Section

Type	Action Number	Action	Campbell County			Bedford County	Bedford City	Lynchburg City	Amherst County		Appomattox County		
			Campbell County	Town Altavista	Town Brookneal				Amherst County	Town Amherst	Appomattox County	Town Appomattox	Town Pamplin City
Structural Mitigation	4-1	Maintaining Critical Facilities during Power Disruptions.	High	High	High	Low	Low	Medium	High	High	Medium	Medium	Medium
Structural Mitigation	4-2	Utility Line Protection					Medium				Low		Low
Structural Mitigation	4-3	Evaluate and establish adequate drainage systems		High				Medium	Medium	Medium	Low	Low	Low
Structural Mitigation	4-4	Drought Mitigation - Agriculture Watering Locations				Low			Low	Low			
Structural Mitigation	4-5	Drought Mitigation - Techniques				Low							
Structural Mitigation	4-6	Optimizing Dry Hydrant Installation	Low						Low	Low			
Structural Mitigation	4-7	Monitoring and Maintain areas near Right of Ways	Medium	Medium	Medium		High	Low			Low	Low	Low
Structural Mitigation	4-8	VDOT Coordination with Maintaining Right of Ways		Medium	Medium								



Regional Actions

Once the jurisdictional action meetings were held, the Steering Committee met again to solidify the regional goals that were developed. Most of the regional actions include all of the communities in the Region 2000 Regional Commission. Outlined below is the listing of the regional goals and what jurisdictions are represented in them. Appendix VI-1 illustrates the complete action plan. Stakeholders from each of the communities will be involved in the planning and implementation of the regional actions. Region 2000 Regional Commission will take the lead role on a number of the regional activities. The Regional Water System Action was ranked high by all of the participating jurisdictions. This action is in the beginning stages, with feasibility studies underway. With the completion of this project, the region will be more capable of dealing with high hazard, events such as droughts.

1. Regional Water System

Jurisdictional Actions

Community specific actions have been separated based on the scope of the activity. During the jurisdictional meetings, the stakeholders elaborated on what they wanted or felt could be accomplished within their communities' capability. Outlined below are the community specific actions. It should be noted that the following projects are in addition to the projects that were developed and ranked in the Community Ranking section. Appendix VI-1 contains the complete description for each listed action.

Altavista, Town of

- No additional jurisdictional actions proposed; see Table VI-1 for actions proposed for the Town of Altavista.

Amherst County

1. GIS System
2. Promoting development of Local Emergency Planning Committee(LEPC)

Amherst, Town of

1. Relocate Water Intake

Appomattox County

1. Well site feasibility, scoping and installation
2. 911 questionnaire
3. GIS System

Appomattox, Town of

1. Well site feasibility, scoping and installation
2. 911 questionnaire



Bedford County

1. Economic development assessment of James and Roanoke River Interconnectivity
2. Promoting development of Local Emergency Planning Commission (LEPC)
3. Identify and prioritize road maintenance and development
4. Smith Mountain Lake debris removal maintenance

Bedford City

1. Maintaining water sharing zone understanding

Brookneal, Town of

- No additional jurisdictional actions proposed; see Table VI-1 for actions proposed for the Town of Brookneal.

Campbell County

- No additional jurisdictional actions proposed; see Table VI-1 for actions proposed for Campbell County.

Pamplin City, Town of

1. Well site feasibility, scoping and installation
2. 911 questionnaire

Lynchburg City

1. Updating Snow removal plan



Capability Assessment

The capability assessment is a way to quantify the ability of the communities and regional commission to carry out actions that have been proposed in the hazard identification and risk assessment and the mitigation actions sections. Some of the jurisdictions already have in place mitigation items that work hand in hand with their ability to respond to event, or help to lessen their impacts. Smaller jurisdictions, such as Appomattox County, Town of Appomattox, Town of Pamplin City, Amherst and the Town of Amherst, have more of a challenge. These challenges will be explained through the localities capability assessment and their reliance on the Region 2000 Regional Commission for additional support. Mitigation actions that already are in place include actions 1-1 Weather Relater Education; 3-3 Drought Mitigation with Voluntary Restrictions; 4-4 Drought Mitigation with Agriculture Watering Locations; and 2 File for Life Forms/911 Questionnaires. Some regional actions are currently in the scoping and assessment phase of development; including Regional Water System – Creating a Secondary Water Supply and the National Weather Service Storm Ready Program. [See Appendix VI-1 for Action Descriptions] With the advancement of proposed actions, (e.g., GIS systems) their governments will increase their ability to mitigate and respond. The availability of state and federal funds will directly drive the capability of the jurisdictions in Region 2000 Regional Commission.

This section should serve as a guide to the communities on their limitations in preparedness, current capabilities, and what areas they need to improve to be able to successfully mitigate and recover from disasters that can impact their regions.

Local capability serves as the foundation for designing an effective hazard mitigation plan and action items. It not only helps establish the goals and objectives, but assures that those actions are realistically achievable under given local governing and capability. The jurisdictional assessment should detect any existing gaps, shortfalls, or weaknesses within existing governmental activities that could exacerbate a community's vulnerability. The assessment also will highlight the positive measures already in place or being completed at the local level, which should continue to be supported and enhanced, if possible, through future mitigation efforts.

Assessment was completed on six main areas for Region 2000 Regional Commission, similar to the factors involved in the STAPLE(E) ranking criteria. These areas of capability being the following:

- Administrative Capability,
- Technical Capability,
- Fiscal Capability,
- Planning Capability,
- Legal Capability



Administrative Capability

Community Organization

There are three types of jurisdictions included in this Hazard Mitigation Plan: cities, counties, and towns. Cities are independent local government entities from any surrounding counties or towns and have their own governing councils, constitutional officers, and administrative staffs. Counties also are independent local government entities similar to cities, but may contain incorporated towns within their boundaries. Incorporated towns are semi-independent local government entities, with taxing authority and other limited authority in addition to the surrounding county.

All of the counties in Region 2000 Regional Commission operate under a Traditional Form of government within the Commonwealth of Virginia. Under this form of government, an elected Board holds responsibility for the general legislative and administrative affairs of the jurisdiction. In the counties, a Board of Supervisors is elected, containing five to seven members from different districts within the county with a Chair and Vice Chair. The cities and towns in Region 2000 use a Mayor-Council Form of government. For cities, a City Council are elected, with council members being at-large or representing specific wards or regions. Towns have a similar organization with a Town Council, with election of a Mayor and Council members.

For cities and counties, these forms of government also require election of other officers, known as Constitutional Officers, who are responsible for the administration of certain specific aspects of community affairs. This usually includes the clerk of the court, commissioner of revenue, commonwealth's attorney, sheriff, and treasurer. The elected boards can also hire an administrator who oversees daily operations of the community and community staff. In counties, this is the county administrator, while in cities and town this is the city or town manager. In counties and cities, the Board is responsible for establishing community policy via passage of resolutions and ordinances within limitations established by the General Assembly, approving an annual operating budget, setting tax rates, and making appointments to various boards and committees. The Board also approves land use plans and any subsequent amendments via re-zonings. Business is conducted in public meetings, though the Board may elect to enter into a Closed Session to discuss issues that are exempt from the Virginia Freedom of Information Act (FOIA), including personnel or legal issues¹.

The incorporated towns must have an elected governing body. Under the Mayor Council Form of government, the powers of government are vested in a Town Council. The Town Council is responsible for developing an annual Town budget, amending the Town Code, and developing policy to guide the activities of the Town. Council also has taxing authority and sets tax rates that are in addition to the County's rates for those citizens

¹ Appomattox Community Development Plan, 2003. <http://www.appomattox.com> Retrieved on 12/20/05.



who live within the Town limits. A Mayor, not considered a member of Town Council, is also elected by all voters within the Town. The Mayor's duties include presiding over Council meetings and voting only in the event of a tie. The Mayor and Council Members are each elected to two-year terms².

The Town Council can choose to employ a Town Manager who is charged with overseeing the daily operations of the Town and carrying out the policy set forth by Council. Other functions of the Town Manager include communicating with the public and media, setting Council agendas and preparing associated materials, and assisting Council as needed. The Town Manager represents Council at many local, regional, and state functions and directs that activities of various departments. Towns have zoning and planning authority though they may choose to use the county planning commission as their town planning commission. Towns have the ability to issue general obligation and revenue bonds. In addition, towns of over 5,000 may appoint an emergency services director and exercise emergency powers separate from the county.

Under the County Administrator or the City or Town Manager, each jurisdiction has numerous departments and boards that are responsible for the various functions of local government. The following table highlights the departments in each jurisdiction that could facilitate the implementation of this hazard mitigation plan.

² Code of Virginia, 1950, (as amended); Section 15.2-200 tp 15.2-208.



Table VI-2: Key Departments

Region 2000 Key Departments by Jurisdiction	
Jurisdiction	Departments
Amherst County	Emergency Services Economic Development Information Technology Inspections Maintenance Parks and Recreation Planning and Zoning Public Safety Service Authority
Amherst, Town of	Planning Fire Chief
Appomattox County	Parks & Recreation County Sheriff Emergency Services County Attorney County Planner Building Inspector/Official Health Inspector Social Services
Appomattox, Town of	Clerk
Pamplin City, Town of	Fire Chief Public Utilities (Water, Wasterwater, Solid Waste, Gas, Electric)
Bedford City	Electric Emergency Services Fire Chief Parks, Recreation, and Cemeteries Planning and Community Development Public Services
Bedford County	Building Inspections Fire & Rescue Services GIS Natural Resources Parks and Recreation Planning Utilities (PSA)
Campbell County	Community Development Building Inspector/Official Emergency Services Fire Chief Economic Development Real Estate and Mapping GIS Public Safety Parks and Recreation Zoning Utility and Service Authority
Altavista, Town of	Public Works Zoning Fire Chief



Region 2000 Key Departments by Jurisdiction	
Jurisdiction	Departments
Brookneal, Town of	Fire Chief Public Works
Lynchburg City	Community Planning and Development Economic Development Emergency Services Fire and EMS Information Technology Parks and Recreation Zoning Public Works

Departmental Descriptions

Members of the Region 2000 RC Steering Committee have been involved in the development of this mitigation plan in order to identify gaps, weaknesses or opportunities for enhancement with existing mitigation programs. Representatives of these departments have been involved in the development of this mitigation plan in order to identify gaps, weaknesses or opportunities for enhancement in existing mitigation programs. Although exact responsibilities differ from jurisdiction to jurisdiction, the general duties of the departments highlighted in Table VI-2 are described below.

The Building Inspections office or department enforces the Virginia Uniform Statewide Building Code (VUSBC). This code includes many floodplain management considerations as it impacts site construction.

Community Development departments are typically responsible for managing grant programs funded by the U.S. Department of Housing and Urban Development. These grant programs include the Community Development Block Grant Program and the HOME Program. Community Development departments also may develop residential and commercial revitalization plans for older areas, serve as a resource on housing and community development issues and undertake special redevelopment projects.

Economic Development departments concentrate on ensuring the growth and prosperity of existing businesses. These departments often administer small business loan programs, state economic development programs, and workforce training programs. They also may recruit new businesses.

Emergency Management or Services departments are responsible for the mitigation, preparedness, response and recovery operations that deal with both natural and man-made disaster events. Often, these functions may be included in a department of Public Safety that encompasses building inspections, emergency management, and fire safety. Fire/EMS departments provide medical aid and fire suppression at the scene of accidents and emergencies. These departments are often responsible for responding to hazardous materials incidents.



Parks and Recreation departments may be responsible for open space programs. If acquisition projects are undertaken, coordination with this department becomes critical. The Planning Department (or Department of Development) addresses land use planning. This department, depending on the jurisdiction, may enforce the National Flood Insurance Program requirements and other applicable local codes. See the ***Planning Capability Floodplain Management Section*** for the specific department that is responsible for enforcing the National Flood Insurance Program.

In Region 2000, the Public Utilities Department oversees the maintenance of infrastructure including roadways, sewer and stormwater facilities, and the community's electric, gas, wastewater and water treatment facilities. Depending on the jurisdiction, the Department of Public Works may enforce the National Flood Insurance Program requirements. See the ***Planning Capability Floodplain Management Section*** for the specific department that is responsible for enforcing the National Flood Insurance Program.

Hazard Mitigation cuts across all of these disciplines. For a successful mitigation program, it is necessary to have a broad range of people involved with diverse backgrounds. These people include planners, engineers, building inspectors, zoning administrators, floodplain managers, and people familiar with Geographic Information Systems (GIS). It is also important that mitigation be assigned a specific responsibility to a department or person. Table VI-3 provides information on each jurisdiction's current staff and organizational capabilities in key areas related to mitigation.



Table VI-3 – Administrative Capability

Region 2000 Administrative Capability ³							
Jurisdiction	Land Use Planners	GIS Staff	Emergency Planners	Intergovernmental & Regional Cooperation	Building Inspectors	Fire Departments	Overall Administrative Capabilities
Amherst County	Yes	No	Yes (Emergency Services Director) –Works with Volunteer Organizations	Yes	Yes	Yes and Volunteer	Medium
Amherst, Town of	Yes	No	No	Yes	No	Full Time Chief and Volunteer	Low
Appomattox County	Yes	No	No - Volunteer Rescue Squad	Yes	Yes	Volunteer	Medium
Appomattox, Town of	Yes	No	No	Yes	No	No – Through Appomattox County	Low
Pamplin City, Town of	No	No	No	Yes	No	Full Time Chief and Volunteer	Low
Bedford City	Yes	No	Yes (Emergency Services Director)	Yes	Yes	Full Time Chief and Volunteer	High
Bedford County	Yes	Yes	Yes (Emergency Services Director)	Yes	Yes	Yes and Volunteer	Medium
Campbell County	Yes	Yes	Yes (Emergency Services Director) – Public Safety works with Volunteer Organizations	Yes	Yes	Full Time Chief and Volunteer	High
Altavista, Town of	Yes	No	No – Planning through Campbell County with Volunteer EMS	Yes	No	Full Time Chief and Volunteer	Medium
Brookneal, Town of	Yes	No	No	Yes	No	Full Time Chief and Volunteer	Low
Lynchburg City	Yes	Yes	Yes – Working with Fire & EMS Department	Yes	Yes	Yes	High

³ Supplemented with Firehouse Website <http://www.firehouse.com/> , Locality Websites, and 2004-2005 Virginia Association of Counties/Virginia Municipal League Directory of Counties, Cities and Towns.



Technical Capability

Technical capability, in this plan, refers to the technology available to the jurisdictions to support mitigation programs and projects. A Geographic Information System (GIS) is critical in identifying potential vulnerable areas and for managing spatial information. Internet sites can be a powerful way to communicate with community members. Public education is an important element of a successful mitigation program.

GIS systems can best be described as a set of tools (hardware, software and people) used to collect, manage, analyze and display spatially-referenced data. Many local governments are now incorporating GIS systems into their existing planning and management operations. GIS is invaluable in identifying areas vulnerable to hazards. Access to the Internet can facilitate plan development, public outreach, and project implementation.

Table VI-4 summarizes the technical capabilities of the jurisdictions. Most of the jurisdictions have GIS capabilities. A majority of the jurisdictions have government websites that could be utilized to promote hazard mitigation.

Table VI-4 – Technical Capability

Region 2000 Technical Capabilities			
Jurisdiction	GIS Capabilities	Website	Overall Technical Capability
Amherst County	Through RC	Yes	Medium
Amherst, Town of	Through RC	No	Low
Appomattox County	Consultant	Yes	Low
Appomattox, Town of	Through RC	No – Partial with County Site	Low
Pamplin City, Town of	None	No – Partial with County Site	Low
Bedford City	Consultant	Yes	High
Bedford County	Yes	Yes	Medium
Campbell County	Yes	Yes	High
Altavista, Town of	Through Campbell County	Yes	Medium
Brookneal, Town of	Through Campbell County	Yes	Low
Lynchburg City	Yes	Yes	High



Fiscal Capability

The local jurisdictions in the planning area receive most of their revenue through state and local sales tax, local services, and through restricted intergovernmental contributions (federal and state pass through dollars). It is unlikely that any of the communities could easily afford to provide the local match for the existing hazard mitigation grant programs. This is a significant and growing concern considering the current budget deficits at both the state and local government level in Virginia, combined with the apparent increased reliance on local accountability by the federal government.

Under DMA 2000, FEMA has made special accommodations for "small and impoverished communities," who will be eligible for a 90% federal share, 10% non-Federal cost share for projects funded through the Pre-Disaster Mitigation (PDM) grant program. The definition is restricted to "communities of 3,000 or fewer individuals that is identified by the State as a rural community." According to the current Interim Final Rule for Section 322 of the Act, none of the counties and cities in the planning area will qualify as a small and impoverished community.

Table VI-5 indicates the fiscal capabilities by jurisdiction for the Region 2000 RC. The overall and non-education budget for each community is listed. For cities and counties, educational funding usually at least half of the overall budget. For town, educational funding is covered by the surrounding county.

Table VI-5 – Fiscal Capability

Region 2000 Fiscal Capability⁴			
Jurisdiction	Overall Budget	Non-Education Budget	Overall Fiscal Capabilities
Amherst County	\$52,047,454 (FY03)	\$16,176,146 (FY03)	Medium
Amherst, Town of	\$2,641,032 (FY03)	\$2,641,032 (FY03)	Low
Appomattox County	\$28,209,851 (FY03)	\$9,411,923 (FY03)	Medium
Appomattox, Town of	\$1,700,000 (app. FY03)	\$1,700,000 (app. FY03)	Low
Pamplin City, Town of	\$74,000 (app. FY03)	\$74,000 (app. FY03)	Low
Bedford City	\$18,958,600 (FY04)	\$12,849,100 (FY05)	Medium
Bedford County	\$128,429,309 (FY05)	\$78,133,721 (FY05)	High
Campbell County	\$131,341,215 (FY05)	\$44,576,359 (FY05)	High
Altavista, Town of	\$6,000,000 (app. FY03)	\$6,000,000 (app. FY03)	Low
Brookneal, Town of	\$900,000 (app. FY03)	\$900,000 (app. FY03)	Low
Lynchburg City	\$127,526,833 (FY05)	\$98,441,984 (FY05)	High

⁴ FY03 Budgets from 2004-2005 Virginia Association of Counties/Virginia Municipal League Directory of Counties, Cities and Towns. FY04 and FY05 from community websites.



Planning Capability

Floodplain Management

Communities that regulate development in floodplains are able participate in the National Flood Insurance Program (NFIP). In return, the NFIP makes federally-backed flood insurance policies available for properties in the community. Table VI-6 shows when each of the jurisdictions began participating in NFIP. All of the jurisdictions in the Region 2000 RC meet NFIP requirements. The table also provides the date of the Flood Insurance Rate Map (FIRM) in effect in each community. These maps were developed by FEMA or its predecessor and show the boundaries of the 100 year and 500 year flood. As the table shows, seven of the eleven FIRMs in effect in the planning area are over twenty-five years old, three are over twenty years old, and one is thirteen years old. Much of the planning area has experienced dramatic growth over the past two decades that is not reflected in the FIRM. This difference may mean that the actual floodplain varies from that depicted on the map.

Table VI-6 – Community Floodplain Management Status

Region 2000 National Flood Insurance Program Details					
Jurisdiction	Entry in NFIP	FIRM Current Effective Date	Policies in Force	Losses Paid	Enforcement Department
Amherst County	7/17/1978	7/17/1978	38	\$1,246,823	Planning & Zoning
Amherst, Town of	11/2/1977	11/2/1977	2	\$128,029	Planning & Zoning
Appomattox County	7/17/1978	7/17/1978	6	\$253,216	Zoning (Building Inspector)
Appomattox, Town of	5/25/1984	5/25/1984	0	\$0	Zoning (Building Inspector)
Pamplin City, Town of	2/12/1976	2/12/1976	0	\$0	Zoning (Building Inspector)
Bedford City	6/1/1978	4/2/1992	3	\$0	Planning & Community Development
Bedford County	9/29/1978	6/29/1979	85	\$155,431	Zoning (Building Inspector)
Campbell County	10/17/1978	4/17/1984	11	\$501,215	Zoning
Altavista, Town of	8/1/1978	4/11/1980	14	\$50,215	Zoning
Brookneal, Town of	3/1/1978	1/18/1980	4	\$0	Zoning
Lynchburg City	9/1/1978	11/16/1983	92	\$3,195,912	Zoning

Virginia statutes provide cities and counties the land use authority. In particular, issues such as floodwater control, are empowered through §15.2-2223 and §15.2-2280. All of the jurisdictions in the planning area have adopted a local floodplain ordinance as a requirement of participation in the National Flood Insurance Program.

The Community Rating System (CRS) was implemented in 1990 as a program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. Residents of communities that participate in CRS receive a



reduction in the flood insurance premium. There are ten CRS classes: class 1 requires the most credit points and gives the largest premium reduction; class 10 receives no premium reduction. None of the jurisdictions in this hazard mitigation plan are members of the CRS.

Comprehensive Plans

A community's comprehensive plan provides the future vision for the community regarding growth and development. Hazard mitigation planning is not specifically addressed as a goal or objective in any of the comprehensive plans in the study area. Only one comprehensive plan includes a hazard mitigation strategy. However, many of the plans include land use or environmental protection goals that could support future mitigation efforts. These goals generally address flood-prone areas. There also may be opportunities to include hazard mitigation in revisions to the comprehensive plans and to link to existing goals. For example, limiting development in the floodplain (which can be considered mitigation) also may help meet open space goals laid out in a plan. Table VI-7 provides details on those sections of the community plans that relate to Hazard Mitigation.

Stormwater Management Plans

The City of Lynchburg and the Town of Altavista have begun to address stormwater management challenges through the development of independent stormwater management plans. For location with dense, urban development, stormwater infrastructure is often necessary to convey water from more frequent events (10-, 25-, 50-year) than what is addressed by floodplain management and mapping. Also, newer state and federal regulations are requiring certain communities to address stormwater quality issues. Often stormwater management plans and the resulting capital improvement projects can also address flooding concerns. Table VI-7 provides details on those communities that have stormwater management plans.

Emergency Operations Plans

A comprehensive Emergency Operations Plan (EOP) typically predetermines actions to be taken by government agencies and private organizations in response to an emergency or disaster event. The plan describes the jurisdiction's capabilities to respond to emergencies and establishes the responsibilities and procedures for responding effectively to the actual occurrence of a disaster. Hazard mitigation is incorporated into the various operational phases of these plans.

Hazard mitigation is included as a functional annex to the Emergency Operations Plans developed by many jurisdictions. Generally, the annex describes the responsibilities of various departments and agencies, private businesses, and the public. The annex outlines a concept of operations that explains what activities will be undertaken before and after a disaster. Specific tasks are assigned to the Board of Supervisors/City Council (or other local governing body), Department of Emergency Services, Department of Health,



Building Officials/County Engineer/Planning and Zoning, Law Enforcement, Fire Department and Emergency Crew, Superintendent of Schools, and Public Information Officer. Table VI-7 provides details on those sections of the community plans that relate to Hazard Mitigation.



Table VI-7 – Planning Capability

Region 2000 Community Plans Related to Hazard Mitigation ⁵				
Jurisdiction	Comprehensive Plan	Stormwater Management Plan	Emergency Operations Plan	Planning Capability
Amherst County	Yes – New version currently under development; Chapters related to Hazard Mitigation will include Environment, Community Facilities and Services, and Land Use. When plan is complete it will be posted to the County's website (tentative 5/2006).	No – Amherst County Code of Ordinances has adopted the and incorporated the State Erosion and Sediment Control Regulations	Yes	Medium
Amherst, Town of	N/A – Hazard Mitigation items covered in Amherst County Plan	No- Amherst County Code of Ordinances has adopted the and incorporated the State Erosion and Sediment Control Regulations	No – Emergency Services planning provided by Amherst County	Low
Appomattox County	Yes – Community Development Plan (AKA Comprehensive Plan) has chapters related to Hazard Mitigation including Natural Environment and Resources, Community Facilities and Services, Growth Management, and Information Technology	No	Yes	Medium
Appomattox, Town of	N/A – Hazard Mitigation items covered in Appomattox County Plan	No	No – Emergency Services planning provided by Appomattox County	Low
Pamplin City, Town of	N/A – Hazard Mitigation items covered in Appomattox County Plan	No	No – Emergency Services planning provided by Appomattox County	Low
Bedford City	Yes - Chapters related to Hazard Mitigation include Community Facilities and Services, Environment, and Existing Land Use	No	Yes	Medium
Bedford County	Yes – Chapters related to Hazard Mitigation include Environmental Factors, Utilities, and Land Use	No	Yes – New Master Plan for Fire & Rescue Services currently under development	Medium

⁵ Based on information from community websites, available through <http://www.regcomm.org/Links%20new.htm>.



Region 2000 Community Plans Related to Hazard Mitigation ⁵				
Jurisdiction	Comprehensive Plan	Stormwater Management Plan	Emergency Operations Plan	Planning Capability
Campbell County	Yes – New version currently under development; Chapters related to Hazard Mitigation include Forest Land Assessment, Infrastructure Development, Land Use, and Natural Environment	No – Chapter 8 of the Campbell County Code of 1988 details Erosions and Sedimentation Control and Stormwater Management	Yes – Includes Chapters on Hazard Mitigation and Human-Caused Hazards	High
Altavista, Town of	Yes - – Chapters related to Hazard Mitigation include Natural Environment, Community Facilities and Services, and Land Use	Yes – Addresses new state and federal environmental laws and regulations, floodplain management issues, design methods, and engineering practices.	No – Emergency Services planning provided by Campbell County	Medium
Brookneal, Town of	N/A – Hazard Mitigation items covered in Campbell County Plan	No	No – Emergency Services planning provided by Campbell County	Low
Lynchburg City	Yes – Chapters related to Hazard Mitigation include Citywide Land use and Development, Downtown and Riverfront Master Plan, Natural Systems, Parks & Recreation, Public Utilities, and Public Facilities	Yes – Stormwater issues addressed in Combined Sewer Overflow Project and Stormwater Management Ordinance	Yes – Includes Annex on Human Caused Hazards	High



Amherst County (including the Town of Amherst)

The Planning and Zoning department is responsible for updating and amending the Amherst County Comprehensive Plan. The plan covers, to varying degrees, all aspects of our cultural and physical landscape. The plan addresses land use types, roads, sewer and water services, public safety, public education, environmental issues, recreation, and even aesthetic issues. The plan has legal standing, in fact is required by Virginia law, but is used only to guide or influence actual courses of action by county government. Implementation of the plan usually takes the form of policy or law.

Through the Code of the County of Amherst, Virginia General Ordinances of the County (1987, codified through Ord. of April 19, 2005⁶) Amherst County has adopted the Virginia Uniform Statewide Building Code and the State Erosion and Sediment Control Regulations. Appendix A Article VII of the code details Floodplain regulations in Amherst County. The purpose of this district is to prevent the loss of property and life, and creation of health and safety hazards, the disruption of commerce and governmental services, the extraordinary and unnecessary expenditure of public funds for flood protection and relief, and the impairment of the tax base by:

- Regulating uses, activities, and development which, acting alone or in combination with other existing or future uses, activities and development, will cause unacceptable increases in flood heights, velocities and frequencies.
- Restricting or prohibiting certain uses, activities, and development from locating within areas subject to flooding.
- Requiring all those uses, activities, and developments that do occur in flood-proofed against flooding and flood damage.
- Protecting individuals from buying lands and structures which are unsuited for intended purposes because of flood hazards.

Appomattox County (including Town of Appomattox and Town of Pamplin City)

The local government staff along with the Joint Appomattox Planning Commission is responsible for updating and amending the community development plan. The Natural Environment section of the plan details objectives to minimize risks to personal safety and property from natural hazards as well as protect environmentally sensitive and/or scenic areas of the County. The Zoning Ordinances in Appomattox County include floodplain regulations. The purposes of the plan include:

- First, it establishes government policy used to help guide public and private activities as they relate to land use and resource utilization.

⁶ Amherst County, Code of Ordinances. Retrieved from <http://www.municode.com/services/mcsgateway.asp?sid=46&pid=10359> on 1/3/2006.



- Second, it is the basis for land development regulations and decisions (i.e. re-zonings and conditional use permits), capital improvement programming (i.e. public projects such as schools, parks and libraries), transportation, environmental and historical resource protection initiatives, new County programs and decisions concerning the distribution of County budget dollars to a multitude of programs and agencies.
- Most importantly, it serves as the community's guide for future development and as the vision for what the County should look like in twenty years.

Appomattox County along with its towns works with a variety of different agencies and organizations, one being the Region 2000 Regional Commission. The Regional Commission is focused on providing economic competitiveness on a regional basis, reducing redundancy in government, improving efficiency, enhancing services, and improving implementation time for regional projects. This organization provides a forum for innovative and creative interaction in the effort to address quality of life issues on a regional basis and offers a variety of technical and program services to its member localities, particularly in the areas of grant applications and administration and geographic information systems (GIS)⁷.

Bedford City

Bedford City goals include protecting and promoting sound development and growth practices that take into account environmental factors (i.e. flooding, fire, drought). The Department of Planning and Community Development includes planning, economic development, the building department, and code enforcement. This department reviews site plans and plat surveys, works with businesses looking to relocate or establish themselves in Bedford, works with the community to develop and update the Comprehensive Plan, administers the Land Development Regulations and Zoning and enforces the City Code as well as the Uniform Statewide Building Code (USBC). The Zoning Ordinances in Bedford City include floodplain regulations.

For the purpose of planning, the City of Bedford Land Development Regulations was divided into different types of districts. The intent of Flood Hazard District FH is to preserve and protect lives and property in the flood plains of the City and to satisfy the United States Department of Housing and Urban Development and the State Water Control Board requirements for full entry into the National Flood Insurance Program, upon adoption of the Official Flood Hazard District Map from an engineering study. [Amended 5/28/91]⁸

⁷ 2003 Appomattox Community Development Plan. Retrieved from <http://home.mindspring.com/~appomattoxco/download.html> on 1/3/2006.

⁸ Bedford City Land Development Regulations. Retrieved from <http://www.bedfordva.gov/online/docs/LDRnew/article4.html> on 1/3/2006.



Bedford County

The Bedford County Department of Planning is responsible for updating the Comprehensive Plan for the County. The County is currently in the process of updating the 1988 version of the plan. The County administrator or his designee serves as the zoning administrator. The zoning administrator is responsible for the enforcement of the zoning ordinance. The zoning ordinance in Bedford County includes floodplain regulations.

The zoning regulations and districts set forth in this ordinance are for the general purpose of implementing the comprehensive plan of Bedford County. The Zoning Ordinances in Bedford County include floodplain regulations. They are designed to achieve the general purposes of promoting the health, safety, and general welfare of the public, and of further accomplishing the objectives of Section 15.2-2200 of the Code of Virginia, as amended. To these ends, this ordinance is designed to give reasonable consideration to each of the following purposes:

- Provide for adequate light, air, convenience of access, and safety from fire, flood and other dangers;
- Reduce or prevent congestion in the public streets;
- Facilitate the creation of a convenient, attractive, and harmonious community;
- Facilitate the provision of adequate police, fire protection, disaster evacuation, civil defense, transportation, water, sewer, flood protection, schools, parks, forests, playgrounds, recreational facilities, airports, and other public requirements;
- Protect against destruction of, or encroachment upon, historic buildings or areas;
- Protect against one or more of the following: overcrowding of land, undue density of population in relation to the community facilities existing or available, obstruction of light or air, hazards and congestion in travel and transportation, or loss of life, health, or property from fire, flood, panic, or other hazards;
- Encourage economic development activities that provide desirable employment and enlarge the tax base;
- Provide for the preservation of agricultural and forested lands;
- Protect approach slopes and other safety areas of licensed airports, and;
- Protect surface and groundwater resources⁹.

⁹ Bedford County Zoning Ordinance. Retrieved from <http://www.co.bedford.va.us/Res/Planning/Zoning/Ordinance/EntireArticleI.pdf> on 1/3/2006.



Campbell County (including Town of Altavista and Town of Brookneal)

Campbell County Community Development staffs, with the input of the Board of Supervisors, Planning Commission, and citizens are responsible for updating the Comprehensive Plan¹⁰.

The County has adopted and incorporated the State Erosion and Sedimentation Regulations. The Campbell County Code of 1988 includes a chapter on Erosion and Sedimentation Control and Stormwater Management¹¹. The Zoning Ordinances in Campbell County include floodplain regulations. The purpose of this zoning ordinance is to promote the general health, safety and welfare of the public and for the accomplishment of the above stated objectives. To these ends, this ordinance has been designed to give reasonable consideration to each of the following purposes, where applicable:

- To provide for adequate light, air, convenience of access, and safety from fire, flood, crime and other dangers;
- To facilitate the provision of adequate police and fire protection, disaster evacuation, civil defense, transportation, water, sewerage, flood protection, schools, parks, forests, playgrounds, recreational facilities, airports and other public requirements;
- To protect against one or more of the following: overcrowding of land, undue density of population in relation to the community facilities existing or available, obstruction of light and air, danger and congestion in travel and transportation, or loss of life, health or property from fire, flood, panic and other dangers;
- To encourage economic development activities that provide desirable employment and enlarge the tax base;
- To provide for the preservation of agricultural and forestal lands and other lands of significance for the protection of the natural environment;
- To protect approach slopes and other safety areas of licensed airports, including United States government and military air facilities;
- To promote the creation and preservation of affordable housing suitable for meeting the current and future needs of the County as well as a reasonable proportion of the current and future needs of the planning district within which Campbell County is situated;
- To make reasonable provisions, not inconsistent with applicable state water quality standards, to protect surface water and ground water as defined in VA. CODE ANN. §62.1-255 (Repl. Vol. 2001).

¹⁰ Campbell County Comprehensive Plan. Retrieved from <http://www.co.campbell.va.us/Comprehensive%20Plan/index.htm> on 1/3/2006.

¹¹ Campbell County Code of 1988. Retrieved from <http://www.co.campbell.va.us/code/index.htm> on 1/3/2006.



Lynchburg City

The vision of Lynchburg City is to take pride in being a sustainable community; one that protects and manages its limited natural, historical, and cultural resources in such a way that the community environment, which its residents value and which sustains us today will sustain future generations. In order to achieve its Vision for the future, the City of Lynchburg has adopted a number of goals for the city government, citizens, organizations, and businesses to work toward. These goals outline broad policies for future action that address the various elements of the City's character that its citizens wish to protect, improve, and enhance. In the Comprehensive Plan, they are used to frame more detailed objectives and strategies, the latter outlining the specific actions that the City and its partners can take to achieve the goals and realize its Vision for the future.

Community Planning and Development Department is responsible for updating the Lynchburg City Comprehensive Plan. Many City officials, boards, and commissions are responsible for implementation of the plan. They include the Planning Commission, Citizen Steering Committee, and City Staff. The Zoning Ordinances in Lynchburg City include floodplain regulations¹².

Legal Capability

This section will detail different legal considerations and their impact on local capability. **In general, all Region 2000 jurisdictions operate within the same legal environment, so there are no major differences in legal capability among the jurisdictions.**

Dillon Rule

The Commonwealth of Virginia is considered a Dillon Rule state, one of only five remaining in the nation along with Kentucky, Minnesota, North Carolina and Pennsylvania. The Dillon Rule, named for John Forest Dillon, chief justice of the Iowa Supreme Court in the late 1800's, is used to interpret state law when there is a question of whether or not a local government has a certain power. Under the Dillon Rule, should reasonable doubt exist as to whether or not a power has been granted to a local government, then the power has not been granted. Therefore, a local government can exercise no power or authority not expressly conferred on the locality by the Virginia General Assembly via the *Code of Virginia* or the local charter¹³.

Local governments in Virginia have a wide range of tools available to them for implementing mitigation programs, policies and actions. A hazard mitigation program can utilize any or all of the four broad types of government powers granted by the State of Virginia, which are: (a) regulation, (b) acquisition, (c) taxation, and (d) spending. The scope of this local authority is subject to constraints; however, as all of Virginia's political subdivisions must not act without proper delegation from the state. All power is

¹² Lynchburg City Comprehensive Plan. Retrieved from <http://www.lyncburgva.gov/home/index.asp?page=724> on 1/3/2006.

¹³ Commonwealth of Virginia Code of Virginia <http://www.myvirginia.org> Retrieved on 12/21/05



vested in the state and can only be exercised by local governments to the extent it is delegated. Thus, this portion of the capabilities assessment will summarize Virginia's enabling legislation which grants the four types of government powers listed above within the context of available hazard mitigation tools and techniques.

Regulation

Virginia local governments have been granted broad regulatory powers in their jurisdictions. Virginia State Statutes bestow the general police power on local governments, allowing them to enact and enforce ordinances which define, prohibit, regulate or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances (including public health nuisances). Since hazard mitigation can be included under the police power (as protection of public health, safety and welfare), towns, cities and counties may include requirements for hazard mitigation in local ordinances. Local governments also may use their ordinance-making power to abate "nuisances," which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard.

Land Use

Regulatory powers granted by the state to local governments are the most basic manner in which a local government can control the use of land within its jurisdiction. Through various land use regulatory powers, a local government can control the amount, timing, density, quality, and location of new development. All these characteristics of growth can determine the level of vulnerability of the community in the event of a natural hazard. Land use regulatory powers include the power to engage in planning, enact and enforce zoning ordinances, floodplain ordinances, and subdivision controls. Each local community possesses great power to prevent unsuitable development in hazard-prone areas.

Planning

According to State Statutes, local governments in Virginia may create or designate a planning agency. The planning agency may perform a number of duties, including make studies of the area, determine objectives, prepare and adopt plans for achieving objectives, develop and recommend policies, ordinances, and administrative means to implements plans, and perform other related duties.

The importance of the planning powers of local governments is illustrated by the requirement that zoning regulations be made in accordance with a comprehensive plan. While the ordinance itself may provide evidence that zoning is being conducted "in accordance with a plan," the existence of a separate planning document ensures that the government is developing regulations and ordinances that are consistent with the overall goals of the community.

Zoning





Zoning is the traditional and most common tool available to local governments to control the use of land. Broad enabling authority is granted for municipalities and counties in Virginia to engage in zoning. Land “uses” controlled by zoning include the type of use (e.g., residential, commercial, and industrial) as well as minimum specifications that control height and bulk such as lot size, building height and set backs, and density of population. Local governments are authorized to divide their territorial jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts. Districts may include general use districts, overlay districts, and special use or conditional use districts. Zoning ordinances consist of maps and written text.

Every locality in the state that enacts a zoning ordinance is required to also establish a board of zoning appeals. The responsibilities of the Board of Zoning Appeals include the ability to hear and decide appeals of decisions made by the Zoning Administrator; the ability to grant variances to provisions of the Zoning Ordinance based on strict guidelines; and the ability to provide interpretations for zoning district boundaries where uncertainty exists. The Board of Zoning Appeals does not have the authority to rezone property or to rule upon or revoke conditional use permits, powers reserved for the Board of Supervisors. Decisions of the Board of Zoning Appeals made be appealed to Circuit Court¹⁴.

Subdivision Regulation

Subdivision regulations control the division of land into parcels for the purpose of building development or sale. Flood-related subdivision controls typically require that sub-dividers install adequate drainage facilities and design water and sewer systems to minimize flood damage and contamination. They also may prohibit the subdivision of land subject to flooding unless flood hazards are overcome through filling or other measures, and they prohibit filling of floodway areas.

Floodplain Regulation

All of the communities in the study area have adopted floodplain regulations that meet the minimum requirements of the National Flood Insurance Program. All of the communities have chosen to implement the floodplain ordinance as a zoning district (regular or overlay) including restrictions on manufactured homes. See the ***Planning Capability Floodplain Management Section*** for the specific details on how the jurisdictions implement their floodplain ordinance. These restrictions include the need for manufactured homes to be elevated and/or anchored to a permanent foundation.

Building Codes and Building Inspection

¹⁴ Code of Virginia 1950, (as amended), Section 15.2-2308 to 15.2-2316.



Many structural mitigation measures involve constructing and retrofitting homes, businesses and other structures according to standards designed to make the buildings more resilient to the impacts of natural hazards. Many of these standards are imposed through building codes. All of the jurisdictions have adopted the Uniform Virginia Statewide Building Code.

Local governments in Virginia also are empowered to carry out building inspections. It empowers cities and counties to create an inspection department, and enumerates their duties and responsibilities, which include enforcing state and local laws relating to the construction of buildings, installation of plumbing, electrical, and heating systems; building maintenance; and other matters. Most of the jurisdictions in the planning area have established a Building Inspections Office or have designated a Building Official to carry out building inspections.

Acquisition

The power of acquisition can be a useful tool for pursuing local mitigation goals. Local governments may find the most effective method for completely “hazard-proofing” a particular piece of property or area is to acquire the property (either in fee simple or a lesser interest, such as an easement), thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. Virginia legislation empowers cities, towns, and counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease or eminent domain. Acquisition has not been used by any of the communities in the planning area though it has been used successfully in other parts of Virginia.

Taxation

The power to levy taxes and special assessments is an important tool delegated to local governments by Virginia law. The power of taxation extends beyond merely the collection of revenue, and can have a profound impact on the pattern of development in the community. Communities have the power to set preferential tax rates for areas which are more suitable for development in order to discourage development in otherwise hazardous areas. Local units of government also have the authority to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending or otherwise building or improving flood protection works within a designated area. This can serve to increase the cost of building in such areas, thereby discouraging development.

Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of necessary services within municipal or county boundaries. In addition, they are useful in distributing to the new property owners the costs of the infrastructure required by new development.



Localities in Virginia collect a 1% sales tax. In addition, all of the jurisdictions in the planning area levy property taxes.

Spending

The fourth major power that has been delegated from the Virginia General Assembly to local governments is the power to make expenditures in the public interest. Hazard mitigation principles should be made a routine part of all spending decisions made by the local government, including the adoption of annual budgets and the Capital Improvement Plan (CIP).

A CIP is a schedule for the provision of municipal or county services over a specified period of time. Capital programming, by itself, can be used as a growth management technique, with a view to hazard mitigation. By tentatively committing itself to a timetable for the provision of capital to extend services, a community can control growth to some extent, especially in areas where the provision of on-site sewage disposal and water supply are unusually expensive.

In addition to formulating a timetable for the provision of services, a local community can regulate the extension of and access to services. A CIP that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools can also influence the cost of growth. If the CIP is effective in directing growth away from environmentally sensitive or high hazard areas, for example, it can reduce environmental costs.



Summary

Table VI-8 provides a summary of the overall capabilities, by jurisdiction. As seen in the table, three of the jurisdictions are indicated as having a high overall capability.

Table VI-8 – Capability Assessment Summary

Region 2000 Overall Capability Assessment					
Jurisdiction	Administrative Capability	Technical Capability	Fiscal Capability	Planning Capability	Overall Capability
Amherst County	Medium	Medium	Medium	Medium	Medium
Amherst, Town of	Low	Low	Low	Low	Low
Appomattox County	Medium	Low	Medium	Medium	Medium
Appomattox, Town of	Low	Low	Low	Low	Low
Pamplin City, Town of	Low	Low	Low	Low	Low
Bedford City	High	High	Medium	Medium	High
Bedford County	Medium	Medium	High	Medium	Medium
Campbell County	High	High	High	High	High
Altavista, Town of	Medium	Medium	Low	Medium	Medium
Brookneal, Town of	Low	Low	Low	Low	Low
Lynchburg City	High	High	High	High	High

Each locality has a range of departments responsible for varying actions. Each locality has determined that their capability for the proposed and ongoing actions adequate relays what can be completed in their localities. Most localities in the region rely on their Local Emergency Planning Commission (LEPC) to implement mitigation actions. Localities that do not currently have an active LEPC have shown an interest in reconvening their organizations (see Section VI for Jurisdictional Actions).



PLAN MAINTENANCE AND IMPLEMENTATION

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PLAN UPDATE.....	5
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Maintaining the Plan

§201.6 (c)(4) A plan maintenance process that includes:

- (i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.
- (ii) A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.
- (iii) Discussion on how the community will continue public participation in the plan maintenance process.

§201.6 (c)(5) Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council). For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

§201.6(c)(5): For Multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

§201.6(d): Plan review. (1) Plans must be submitted to the State Hazard Mitigation Officer for initial review and coordination. The State will then send the plan to the appropriate FEMA Regional Office for formal review and approval.

(2) The Regional review will be completed within 45 days after receipt from the State, whenever possible.

(3) Plans must be reviewed, revised if appropriate, and resubmitted for approval within five years in order to continue to be eligible for HMGP project grant funding.



The Region 2000 Regional Commission's Multi-jurisdiction Hazard Mitigation Plan has pulled together many different resources into one document and should be considered a living document. The plan needs to be updated, adopted and submitted to the Virginia Department of Emergency Management (VDEM) and Federal Emergency Management Agency (FEMA) every five years.

The maintenance of this plan will be the responsibility of the members of the steering committee and representation of the jurisdictions involved. Meetings will be scheduled at the request of the plan's governing body. One of the ways the progress of the mitigation plan will be monitored through is the completion of the mitigation actions.

Adoption

The eleven participating jurisdictions (Amherst County, Town of Amherst, Appomattox County, Town of Appomattox, Town of Pamplin City, Bedford County, Bedford City, Campbell County, Town of Altavista, Town of Brookneal, and Lynchburg City) have adopted by resolution the hazard mitigation plan by their governing body. Appendix IV-13 contains the resolutions from each of the communities.

Once the Hazard Mitigation Plan has been adopted by the individual governing bodies, the jurisdictions will be responsible for incorporating the plan into other local plans as follows:

- **Comprehensive Plans:** These plans are updated every three to five years for each jurisdiction according to specific state regulations. County plans sometimes will cover smaller towns plans as well, due to limited planning capacity of the communities. When these plans are updated, the appropriate information for the community will be extracted from the Multi-Jurisdiction Hazard Mitigation Plan. For comprehensive plans, the HIRA portion of the Hazard Mitigation Plan will be the primary focus for integration, especially on the limitations to future development by the location of hazards such as floodplains or high slope areas. The planning departments of communities are the primary staff involved with comprehensive plan update.
- **Capital Improvement Plans (CIP):** These plans are less formalized than Comprehensive Plans and are the primary tool for determining various community projects, such as street improvements, infrastructure maintenance and repairs, and new community building construction, such as schools. CIPs also play a supporting role to justify expansion of community staff as new departments and programs are established in the annual budget process. The Mitigation Actions section of the Hazard Mitigation Plan will be integrated in each community's CIP and local budgeting as funding and politics allow. For actions such as education, existing or new staff may be able to expand their roles to conduct these projects. For "bricks and mortar" types of actions, these can be built into the CIP budget and timeline. For CIPs, the public



works departments are the primary staff who develops these plans, while annual budgets fall to community administrators and boards.

- **Emergency Operation Plans (EOP):** These plans focus primarily on the immediate response to emergency events. There are numerous important ties between response plans and mitigation plans, often in terms of personnel training and emergency equipment. Also, human-caused hazards such as hazardous materials spills are addressed in EOPs. To integrate the Hazard Mitigation Plan into community EOPs, the community emergency services directors and the Local Emergency Planning Commissions (LEPCs) will work with the community planning staff. For some hazards, like winter storms, the mitigation actions are extensions of response actions, such as clearing tree debris and having backup power available. For other hazards, like flooding, the mitigations actions may be led by planning staff, but first responders can provide valuable information about hazard impacts that will be useful for mitigation grant applications.

Tracking Implementation

Plan implementation will begin with each localities adoption of the mitigation plan. After the plan has been adopted, future implementation will take place in the form of steering committee meetings. When a hazard mitigation plan is put into action it is important to continuously monitor the goals, objectives, strategies, and projects to make sure that they are current and being implemented effectively. One of the best ways of carrying out a mitigation plan is to incorporate these components into the day-to-day functionality and priorities of the government and development of the region. This can include such things as:

- City or Town Comprehensive Plans
- Capital Improvement Budgets and Plans
- Economic Development Goals and Incentives

Not only is it important to track implementation of the plan, but another critical component to success in hazard mitigation is to monitor occurrence and impacts of natural and manmade hazards/disasters within communities in the region. This will not only keep the region up to date on hazard vulnerability but will also keep data and statistics current for analysis and future implementation purposes.

The final thing to consider during implementation is the security of all data and information involved in the plan. Maintain security of any information that pertains to vulnerabilities, security measures, and response plans. Ensure that sensitive information is handled in such a way as to maintain security and have adequate protections in place to ensure that sensitive information is not released when it is requested by members of the public who have no justifiable reason for seeing the information.



Monitoring Progress

This plan will be monitored through meetings of the governing bodies and steering committee members as they see fit. When updates of this plan are needed, the changes will be submitted to VDEM and FEMA for review. Jurisdictions will take on the responsibility for keeping the public involved with the updates and revisions of this plan. Programs are already in place at the local level to deal with different types of hazards. These programs have been documented throughout this plan.

In order to accomplish this method of tracking progress, committees and affiliated entities need to monitor agendas, attend meetings, send memos, monitor funding opportunities, keep stakeholders and the public updated, and promote a safe and sustainable community as a result of the actions within their plan. As the mitigation plan takes shape, progress reports should be compiled and distributed to state and federal agencies, local government, regional commissions, industry, organizations, and legislators.

Evaluating the Plan

Evaluation of the plan will be the responsibility of the governing bodies and steering committee members. Evaluation of the plan will take the form that they have followed in the development of this plan. Comments and additions will be obtained by the governing bodies and steering committee and they will be incorporated in the update of the plan. Realistically, funding for future updates and evaluations of this plan will fall heavily on state and federal resources.

Plan Update

During the implementation process, there may be road blocks, new objectives, new demands, or alternative strategies that arise which force the plan to be altered and updated. It is important to keep track of these changes and incorporate revisions into the plan when necessary. A five-year written update to the Hazard Mitigation Plan will be submitted to VDEM and FEMA for review, unless federal regulations change this timeframe or format. The local community planning and emergency services departments will work closely in updating the portions of the Multi-Jurisdiction Hazard Mitigation Plan that relates to that community. For some communities with greater local capacity, like Lynchburg City, the update to the plan may have the community develop a separate plan document. For the smaller communities, like Town of Brookneal, the plan update will be an integral part of the county's updated plan, since the town has limited planning capacity to update the plan themselves. The plan revisions will include new objectives and strategies, filling in gaps in data as new data becomes available, and describing alternative analysis and implementation procedures. Success in updating this plan involves:

- Evaluating successes and failures of implemented mitigation strategies



- Monitoring changes in and updating hazard risks, asset inventory, government policies and programs, and development trends
- Evaluating public and municipal participation in current implementation strategies

Prioritization

Mitigation plan implementation can flow more smoothly if strategies and projects are prioritized in an order that makes most sense given current hazard vulnerabilities and available funding. This includes prioritizing disaster assessments based on highest vulnerability rankings, targeting key locations and facilities that are impacted the most by each hazard, determining the budgeting requirements for each section of the mitigation plan, and staying on top of funding opportunities that can contribute to project completions. Low or no-cost recommendations have the greatest likelihood of succeeding, so these actions should be pursued first. Then, as new funding becomes available, other high priority projects can be initiated. As in the prioritization of the mitigation projects, the FEMA STAPLE(E) approach will be utilized to determine capability and feasibility of the proposed projects and plan updates. Prioritization will be completed at the jurisdictional level and will follow local evaluation criteria.

The STAPLE(E) prioritization method takes into account seven criteria:

1. Socially Acceptable
2. Technically feasible
3. Administrative support
4. Politically acceptable
5. Legal
6. Economically justifiable
7. Environmentally responsive

Other considerations when prioritizing will be how well the project reduces future losses, how they further the goals and objectives put forth in this plan, and the cost versus the benefit of the project.

Funding Opportunities

By tracking funding opportunities the jurisdictions will be able to apply these funding sources to implement imperative and costly mitigation actions. Pragmatically, funding opportunities from the state and federal government will be the keystone in the future updates of this plan.

Conclusions

With the Region 2000 Regional Commission's All Hazard Plan adopted and in place, the region will have a better handle on mitigating the hazards that impact their region. The shift to mitigating hazards before they happen is prevalent with Region 2000. Through meetings and group interactions it was observed that the region works well together and



already has in place a handful of actions to anticipate events. The region is currently working on some regional actions to mitigate against some of their highest ranked hazards.



REFERENCES

REFERENCES	2
OTHER MITIGATION PLANS:	2
WEBSITES:	2
NEWSPAPERS:	2
SOFTWARE:	2
HIRA DATA REFERENCES:	3



References

Other Mitigation Plans:

- Virginia Department of Emergency Management (VDEM) Commonwealth of Virginia's Standard Hazard Mitigation Plan (2004)
- Washington State Hazard Mitigation Plan (2004)
- Cumberland Plateau Mitigation Plan
- New River Valley Mitigation Plan
- Wyoming County (WV) Mitigation Plan

Websites:

- US Census Bureau: <http://www.census.gov>
- National Climatic Data Center (NCDC):
<http://www.ncdc.noaa.gov/oa/ncdc.html>
- Virginia's PDCs: <http://www.coopercenter.org/vapdc/boundaries/index.php>
- Federal Emergency Management Agency: <http://www.fema.gov>
- Virginia Department of Forestry: <http://www.dof.virginia.gov/>
- Virginia Department of Conservation and Recreation:
<http://www.dcr.virginia.gov/>
- Virginia Department of Environmental Quality Drought Task Force:
<http://www.deq.state.va.us/>

Newspapers:

The News & Advance
The News & Daily Advance
The Roanoke Times
Richmond Times-Dispatch

Software:

- FEMA HAZUS software
- ESRI data and software
- VirginiaView PRISM and Climate Source Data
- FEMA FIS – for community descriptions and flooding/hurricane events



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